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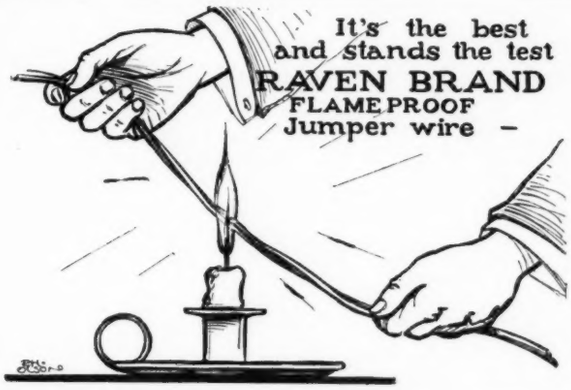

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THE AMERICAN TELEPHONE JOURNAL

Comprising Telephony, American Telephone Journal, Telephone Weekly, Telephone Magazine, Telephone Securities, The Telephone, Sound Waves

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WORK.

Work will keep us out of mischief. If a man has a little more to do than he can do, he will devise and improve methods; if he has less than a day's work to do, he ought to do it in less than a day and not dawdle over it.—John J. Glessner.

The Government Ownership Investigation.

The government ownership of public utilities, including the telephone and telegraph, promises again to occupy more or less the attention of the federal authorities. The United States Senate has adopted the Borah amendment to the Newlands resolution which calls for an investigation of needed changes in interstate commerce laws.

This amendment adds to the original duties of the proposed committee of inquiry, the investigation of the subject of government ownership of all public utilities. If the Newlands resolution goes through, then, the entire question will be probed by a Congressional board of inquiry.

There is such a crying need for federal government action on other matters at the present time, that many leaders of public thought have little patience with this move to revive a proposition of such doubtful value. Congressional investigations and committee inquiries of all kinds serve to keep their authors and directors in the public eye and give them desired publicity. They also create jobs of various sorts, and we all know how keen the politicians' appetites are for patronage. Besides, there is a general election coming in November, and a Congressional investigation of any sort is usually counted upon to manufacture a vast amount of political capital for publication at the psychological moment.

If Congress does decide to organize a fishing expedition on the question of government ownership of public utilities, it is hoped the inquiry will be a thorough one. It may not demonstrate the advisability of public ownership of telephone, telegraph, gas, electric light and railroad systems, but if it goes far enough, such an inquiry undoubtedly will bring to light many conditions that should be corrected. The chances are, too, that these defects can be remedied under the present regulation policy without recourse to the radical policy of government ownership which many men, qualified to judge, declare to be unnecessary and unwise for many reasons.

Only a few weeks ago municipalization of Detroit's street railway was defeated. Union labor was opposed to it. If the labor element arrays itself against the government ownership of public utilities, the political statesmen at Washington, no doubt, will speedily find there are other more important matters to engage their attention. They keep their ears near the ground, and a rumble of protest from the labor vote would probably influence them to pigeon-hole this or any other question that was surrounded by such danger signs.

Pole Shortage Threatened.

One of the visitors to TELEPHONY's editorial offices from the Northern country, this week, brought news that telephone men should consider. He expressed the opinion that the output of poles this winter would be very much under normal figures on account of the unprecedented heavy snowfall in the woods where the cedar comes from.

According to our informant, in some sections of the North, the winter has been more severe than the oldest inhabitant can recall, and the snowfall has been tremendous. Following a heavy snow storm, came sleet storms forming a layer of icy crust; and then more snow—sometimes two feet in depth—and more sleet until it has been found well nigh impossible to work getting out the timber.

"It's up to the telephone man to get his pole order in early," said this visitor, "for there is pretty sure to be a scarcity this year. I believe that pole production this winter will not be much over 50 per cent. of what it was a year ago, and, of course, a shortage in supply means higher prices.

"Many loggers told me they could not get men to work getting out cedar because they couldn't make anything on account of the immense snowfalls. Poles will be at a premium before the year is far advanced."

Factors Tending Towards "The Revival of Business"

One of a Monthly Series of Articles Written with a View of Helping Readers to Think, by Supplying Fundamental Information Rather Than Conclusions—Salient Features Bearing Directly Upon Economic Position of this Country—Pitfalls to be Avoided

By Frank M. Huston,
Financial Editor, Chicago Evening Post—Editor, Rand McNally Bankers' Monthly.

General business is responding to the strong financial conditions in this country in a way that is reassuring. Bank clearings, since the beginning of the year, have established a new high record, while business defaults for the first month of the year, show a decrease in number, of 25 per cent., compared with a year ago, and in liabilities, which aggregate only about one-third what they were in 1915.

All indications favor a further improvement in the business situation, a decline in commercial mortality, and a lessened volume of liabilities. Furthermore, there has been an increase in bank deposits all over the country, that bespeaks a further expansion of business, and an increase in the credit available as a purchasing power. The effect of the enormous influx of gold together with the exceedingly profitable business which Europe is doing with this country, is being reflected in all lines of trade. A few months ago our prosperity was rather spotted; today it is broadening out and becoming more general.

The chief danger in the situation, however, is that our expansion in business may result in an inflation that ultimately must be followed by a reaction and depression. It is for this reason that bankers are admonishing business men generally to proceed with less insistence in expanding their business and to get back on a more normal basis, so far as their borrowings are concerned. In other words, bankers and those who study business conditions closely, are desirous that business men keep their affairs in as liquid a condition as it is possible to do. In this way they will be able to sustain prosperity through the period of readjustment that inevitably must follow the war.

Enormous profits frequently are a lure that leads the business men into unsound ground and in turn lead to disaster. But the man who proceeds cautiously, keeping his affairs in a condition where he can meet his maturing obligations without difficulty, is the man who seldom has to walk the floor, while his over-extended neighbor is indulging in sleepless nights and feverish days.

One of the most reassuring developments, so far as the retail trade is concerned and such wholesale business as relates to the provisioning and clothing of the people, is the extremely well-employed condition of labor. Taken as a whole, labor has never been better employed and has seldom been employed at such a remunerative wage. This is due to the enormous influx of business from Europe. While this has its disturbing feature, in that it increases the cost of production of articles for domestic use, it adds to the purchasing power of the masses in this country. And after all, it is this class that consumes the production of the great majority of our factories.

From all sections of the country come advices of a heavy distribution of merchandise of various kinds, reflecting the increased demand resulting from expanding purchasing power of the country at large. Retail dealers, mail order houses, as well as jobbers of various kinds, are active in making purchases for immediate requirements and for future delivery. Collections are exceedingly good, which is a further reflection of an improved business condition.

Among the railroads there is an evidence of prosperity that has not been experienced in many years. There is no industry in this country, with the possible exception of steel making, that is as basic in its character, as is the transportation business. Railroad earnings are showing monthly increases over a year ago, both in gross and net, which is a healthy condition.

The market for luxuries reflects a greater activity than in many years. People who have been making big profits as a result of the enormous demand and the restricted supply of the things that Europe needs, are expanding their profits with a lavish hand, while those who have been less fortunate are profiting by this distribution of money and credit in various lines of trade.

Capital in this country is accumulating exceedingly rapidly. Naturally with this accumulating, there is a corresponding increase in the demand for labor and for the products of labor.

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Quiz Questions on the Preceding Installment.

324. Why should the coil terminals be connected to the wire of the winding as closely to the spool as possible?

325. Using the winding space of the relay coil in Fig. 126, design a resistance coil winding of 18 per cent. German silver wire insulated with single silk and measuring 9,000 ohms while filling the entire winding space.

326. Define the term "line circuit." What is the line equipment?

327. What is the purpose of the line relay in the common battery line circuit?

328. State some of the reasons why, in connection with the line relay, the line lamp forms a satisfactory type of line signal.

329. Enumerate five general functions of line circuits.

PRACTICAL TALKS JUST AMONG OURSELVES.

General Inspection.

The wire chief at Fosterville had succeeded in bringing the operation of the plant to a point of high efficiency. He had been able to convince the management that reconstruction of the outside plant wherever the cost of maintenance was high would help in giving better service to the public as well as reduce operating costs; and, being a wide-awake telephone man, he realized fully that the only way to secure and hold the public support is to give the best possible quality of service.

The service had improved wonderfully since he had taken charge and it was plain that a proposed raise in rates could be secured without insurmountable opposition. It had been demonstrated to the management that good service, insuring public support, depends upon maintaining the plant in good condition as well as upon an efficient and courteous force of operators.

In switchboard repairs, which the wire chief handled personally, it had always been his policy to fix the trouble *before* it happened. In other words, a continual and thorough inspection of the switchboard was carried out. One third of all the cords were tested each day, so that in three days each cord in the switchboard had been tested. With this method it was extremely unlikely that a subscriber should ever make a report of unsatisfactory transmission and the cause be due to a scratchy switchboard cord.

There were twelve operators on the force and each one had, of course, her own individual transmitter breastplate receiver, cord and plug. The wire chief recommended that three extra sets be purchased for reserve purposes. When they arrived, he began to inspect one-third of the operators' sets each day also, carefully testing out the cords and all the plug contacts. In this way operator's telephone set trouble became an unknown thing in the office. The importance and value of *this* lies in the fact that some operator's telephone set is used in *every* call.

Dust was kept religiously out of the switchboard itself, and on each position the keyboard and its wiring was given a periodical inspection and blowing-out. In this way, the amount of trouble located in the switchboard *after* a report of it had been received, was reduced to nothing.

It had always been the practice of the Fosterville wire chief to keep accurate records of his trouble complaints. In this way he had identified the cases that were "repeaters" and had cleaned up the troublesome condition on each one of them.

It happened that one day the wire chief and the two troublemen were sitting in the office and the conversation turned to the chart of complaint curves that the wire chief maintained as a sort of indicator on the physical condition of his plant. It was his conviction that the service was the best when the number of complaints, from all sources, was least and that it was the poorest when the number of complaints was greatest. In accordance with this idea, and impelled by his interest in the general welfare of the company, he had kept a chart. One vertical line on the cross section paper stood for each day of the month and the vertical spaces, of one inch, were used for 20 complaints each, a total range of 100 cases per day being provided. Each day the number of complaints was spotted and the points spotted were then connected to form a curve.

While the men were looking over the chart and identifying from memory the stormy days as showing the greatest number of complaints, the wire chief suddenly realized that there was no reason why trouble *outside* the office should not be taken care of in the same way as he was taking care of the switchboard trouble. It seemed to him to be logical. Following the idea out, in the morning he appeared in the general manager's office with a request to put the plan into effect.

It was planned to divide the city into two districts, each one to be under the direct supervision of one of the troublemen. Memo-books were to be prepared, listing all the stations in each district and giving their street location. Each man was to be put on his mettle to have the lowest number of complaints per hundred subscribers from *his* territory. Each man was to be given one month before any comparison was made, in order that he might go over his district and put the equipment in good order.

The wire chief explained to the general manager that soon not only would the subscribers be convinced of the company's effort to give the best possible service, but that many cases of potential trouble—such as receiver cords about ready to break down and cause trouble, loose connections, dirty protector car-

bons, broken mouthpieces and receiver shells and loose wires—would be cleared before they had any opportunity to cause complaints of the service. In addition, there would not be *any aditional* expense, as the men would report and receive O. K.'s by telephone from each station inspected, and could be sent on

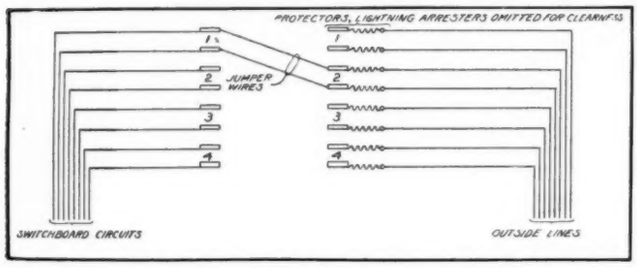


Fig. 130. Principle of Main Distributing Frame.

such reported trouble as might happen to be listed at the time they called in.

The general manager, after a little argument, approved the scheme, and the plan was put into effect. The subscribers were pleased, the number of complaints was reduced and, what was fully as interesting as anything else, the weekly pay check for both the wire chief and the two troublemen took on some little extra weight. The general manager figured that it was not costing as much to clear *reported* trouble as it had cost before. Therefore the officers felt that they should encourage the employes who had the company's interest at heart enough to work out the details of a scheme of this sort and put it into actual use.

CHAPTER XVI. The Typical Line Circuit (Cont'd).

330. *Connecting point between central office and outside lines.*—In every exchange, large and small, there is a point at which the wires from the outside are connected with the wires leading to the switchboard. It is at this point that the protectors, installed in the exchange for excluding damaging currents by operating the circuit, are usually located. In small offices it is the usual practice to place the protectors directly on the terminals of the outside lines as they enter in cable or insulated wires. The switchboard circuits are then connected in sequence to the terminal blocks which form the other element of the main distributing frame. Connections between the protectors, which are numbered the same as the outside circuits to which they belong, and the telephone circuits in the switchboard, are made by means of *jumper* wires.

In telephone practice the term "jumper wire" is used to describe any form of short insulated wire intended to be inserted in any circuit between terminals provided for the purpose, when the terminals are arranged so that either end of the jumper wire may connect with any one and will accomplish the same functions in every case. For instance, the jumper wire on the connecting rack described, may be used to connect one of the circuits entering the office to any desired number in the switchboard. If desirable, the number that had been assigned to this circuit can be changed by merely moving an end of the jumper wire from one pair of terminals to another.

A diagrammatic sketch of this arrangement, known as the main distributing frame, is shown in Fig. 130. It is clear from the sketch that any switchboard circuit, such as No. 1, may be connected to any desired cable pair, such as No. 2, by properly placing the jumper wire. This is true in the largest offices as well as the smallest, and in this fact is found one of the important functions of the main distributing frame. In Fig. 131 is shown diagrammatically the arrangement of the protectors and switchboard terminals to constitute the main distributing frame in offices too large for the type shown in Fig. 130.

331. *The forms of main distributing frames.*—The main distributing frame is found in a variety of forms. In some smaller sized offices, it consists of two vertical strips on one of which are mounted protectors and on the other, switchboard cable terminals. This type conforms closely, in arrangement, to the diagramatic plan shown in Fig. 130.

In the larger offices, the main frame is made from structural iron with protectors mounted on the one side and cable terminals on the other. The framework is an iron skeleton with vertical and cross members on the ends of which the protectors and terminals blocks are mounted. The jumper wires run across and lengthwise of the frame as it is not often that any given cable pair will be found directly opposite the switchboard circuit terminals to which it is destined to be connected. This form conforms closely to the arrangement shown in Fig. 131.

In large multiple offices, the main distributing frame becomes an extremely important piece of equipment. The shelves must be designed so as to afford sufficient space for the great number of jumper wires necessary. The main distributing frame affords an ideal means for testing the subscribers' circuits with *all* exchange equipment disconnected.

332. *Functions of main distributing frame in a large office.*—The main distributing frame is absolutely essential to the exchange. It makes possible the assignment of any desired switchboard circuit to any given incoming circuit. It affords a junction point between the outside plant and the central office at which the circuits may be stripped of all exchange equipment for testing purposes.

The main distributing frame provides, also, a natural and convenient point in the incoming telephone circuit for the insertion of the protective apparatus so essential to the life of the

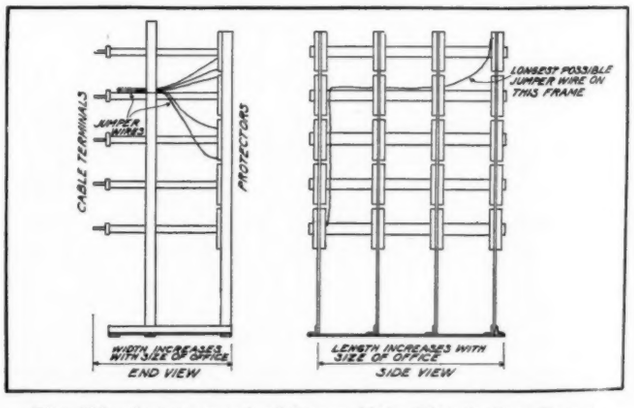


Fig. 131. Arrangement of Large Main Distributing Frame.

equipment; and it is a common point where entering circuits of the same character may be assorted to their respective classes. Toll circuits, for instance, are brought in to the cable side of the main frame and from there connected to the toll switchboard cables by jumper wires.

333. *The switchboard line equipment.*—The main distributing frame is, in fact, the dividing point between the outside plant and the central office. In considering the typical switchboard line equipment, therefore, the discussion may be limited to that portion of the line circuit inside the distributing frame. The terminal of the line circuit at the end not on the distributing frame is at the answering jack with the switchboard signal.

The line *equipment* is usually understood to be the apparatus and wiring in each circuit, included between the distributing frame and the face of the switchboard where the answering jack is found.

It is clear that multiple equipment and wiring should not, in this sense be considered a part of the line equipment. This is true for the reason that the line equipment could remain the same with two multiple jacks as with twenty. It is customary, therefore, to exclude the multiple equipment and wiring from the material in the line equipment.

(To be Continued.)

Postal's President on Composite Circuits and Wireless.

In the annual report of the Mackay companies, reference is made to the use of the telephone circuits for telegraphing and long distance telephone service the Postal Telegraph-Cable Co. is furnishing over its telegraph lines. President Mackay says:

"The Bell telephone system is still extending its leased wire system for day and night telegraph purposes to brokers, newspapers and other concerns; all of which has resulted in a 'contraband' traffic over these wires, which has been investigated by the Interstate Commerce Commission. Testimony has been taken, and a decision is now awaited from that commission as to whether the leased wire system, to brokers particularly, should be restricted or regulated.

The Bell telephone system furnishes these leased wires for telegraphic purposes by the use of the composite circuit, an arrangement by which there is obtained both a telephone and telegraph use of two wires at the same time without either service interfering with the other.

The Postal Telegraph-Cable Co. is using this same composite circuit device to furnish long distance telephone service in various states in the Union, and the financial results are very satisfactory. Extensions of this long distance telephone service are being made. It is found by the public that the long distance telephone service rendered by the Postal Telegraph-Cable Co. is even better than that rendered by the Bell telephone system, owing to the local connections of the latter which are not always of the best.

Letters are constantly received from the public commending this long distance telephone service of the Postal Telegraph-Cable Co. It is also found that the telegraph business is increased by reason of bringing the company into closer touch with many large concerns through their use of the long distance telephone. Moreover, the additional income from this telephone service enables the Postal company to open offices for both telegraph and telephone purposes where the telegraph business alone would be insufficient to justify such extensions, especially in the Southwest, where a connection of the Bell telephone system is giving telegraph service."

There is an interesting discussion of the possibilities of wireless telegraph and wireless telephony. It is convincingly argued that the wireless will never become serious competitors of ocean cable or land lines. The report says:

"Developments in wireless telegraphy and experiments in wireless telephony continue and scientific achievements of incalculable value for the protection and direction of ships and for the changing conditions of the battlefield or other places where poles, wires or cables cannot well be erected or maintained, but nothing has caused your trustees to change or modify their opinion that, as commercial propositions, wireless telegraphy and wireless telephony are and will continue to be negligible. Their limited capacity and the difficulty and expense of operation, measured by the results obtained, will prevent them from ever becoming serious competitors of your ocean cable or land line systems.

This opinion is confirmed by the opinion of many eminent scientific and electrical experts, among them being Charles P. Steinmetz, chief consulting engineer of the General Electric Co., and one of the greatest electrical engineers in the world, who in an interview in the New York World on October 10, 1915, said:

There are certain technical limitations to wireless telephony which will, in my judgment, always prevent it from coming into general use.

Compare it with wireless telegraphy and you will get a good analogy. Wireless telegraphy cannot supplant ordinary telegraphy, because when you carry the number of wireless messages in transit at one time beyond a very limited range, you get an interference between one message and another, which results in destroying the efficiency of the system.

The most powerful wireless system in the world has, since the opening of the war, been in operation between the United States and Germany. Yet the German government made strong representations to the United States government last year looking to the restoration of the submarine cables between those two countries, which were cut at the beginning of the war, on the ground that the wireless was unsatisfactory, and that the German government and German trade were greatly hampered by the absence of direct submarine cable communication with the United States. This, in spite of the fact that the wireless was in operation during all this time between the two countries."

Kansas Mutual Companies Hold Convention.

Nearly 100 representatives from mutual companies in all sections of the state were gathered together in Manhattan, Kan., February 22, at the annual meeting of the Kansas Association of Mutual Telephone Companies. Resolutions were passed providing that a delegation be sent to make representations to Governor Arthur Capper, placing upon him responsibility for what they consider to be the unfair acts of his appointees, members of the public utilities commission. It was stated by a number of delegates that the mutuals have not been receiving fair treatment at the hands of the commission.

Officers for the ensuing year were elected as follows: J. B. Shields, of Lost Springs, president; C. W. Swallow, Wichita, vice-president; M. H. Rice, Delphos, secretary-treasurer. The directors include A. J. Ryan, Augusta; A. W. Jacobs, Wilsey; B. F. Villman, Bavaria; John Atchison, Overbrook; H. C. Beekman, Norton; W. J. Poytle, Council Grove, and C. B. Ingman, of Barnes.

Telephone Consolidation at Hill City, Kan.

The Central Telephone Co., which has operated for some ten years in competition with the Mutual Telephone Co., in Hill City, Kan., was recently purchased at bankruptcy sale by E. G. Taylor, who is also at the head of the Mutual company. Since then a physical connection has been effected between the two exchanges and patrons of either system can now talk with patrons of the other company.

Story of a Wire Chief Who Failed to Make Good and Why

Importance of Properly Coaching and Supervising New Employes Forcibly Brought Out in Experiences of an Assistant Wire Chief—Responsibility of Many Failures Rest With Those in Charge Because of Lack of Properly Training Beginners

By His Friend

Some years ago a man secured a position as an assistant wire chief, in a branch office of a large telephone company. The experiences of this man during the weeks that followed, the results of which were so different from what had been hoped for, make a story which should be of interest to telephone men, since after conscientious effort on his part, his work resulted in his dismissal.

Now this man was not new to the telephone business, for his record showed a dozen years' experience as a lineman and as a general utility man around rural telephone offices, besides having done more or less switchboard work on boards of the P. B. X. type. Such a man would be called a good all around man in a small telephone exchange. About the only place where this man had had no experience at all, was as troubleman on a large multiple switchboard and as tester at a wire chief's desk. A wire chief's desk is a luxury which very few rural telephone companies spend their money on and, this man, in all wanderings among the different telephone organizations where his work had called him, had never become familiar with that most useful and necessary part of the furnishings of any telephone office—a voltmeter test board.

Another thing in regard to our friend's qualifications should be mentioned. He did not have the ability to quickly adapt himself to new conditions. His mind was so constituted that it took considerable time to digest a mass of details, and he needed to thoroughly understand all the reasons for an act or operation, before he could perform that act intelligently. Now any man who has worked at a wire chief's desk will realize that these qualities would be a hindrance to any man in his apprentice work as a trouble tester.

The telephone exchange where these events happened was an office of several thousand lines and the work of the office was somewhat disorganized on account of a recent cut-over. It was an unusually busy place, as many new installations were being made at the time, while line trouble was very heavy on account of the bad condition of the outside plant.

The wire chief in charge of this office was a good switchboard man and trouble tester, who had worked principally on a very large multiple board as troubleman. He had not had much experience in handling men, and had but recently taken charge of this branch office as wire chief.

Taking all these things into consideration, our assistant entered his new work under not the most favorable circumstances.

Duties Assigned to the New Assistant.

After about a 15-minute explanation and demonstration of the operation of a wire chief's desk, and the art of testing for trouble, the duties of his position were taken up. These consisted in the care of the storage batteries and the charging and ringing machines, running jumpers at the cross-connecting racks, and testing trouble, at the wire chief's desk. For the first week or two, the wire chief did most of the testing, having the assistant make a test each morning on lines showing trouble, but keeping him most of the time on various other work about the office.

One thing which was neglected at this time, was to give this assistant a detailed explanation of the meaning of the different readings of the voltmeter in testing lines in their normal condition and when they were showing trouble; also a clear idea of the circuits of the test board, which would explain fully the use of the several keys. There were several matters in connection with the use of the keys in these circuits which this man did not fully understand until a long time later when he wired up a test circuit himself.

Test Board Confusing to Apprentice.

To an experienced man, testing at a wire chief's desk is a very simple matter, but to an apprentice, who does not have a good idea of the circuits of the test board as well as the circuits of the "A" and "B" boards, the operation of the test board is very confusing. The different readings of the voltmeter do not convey a clear idea to his mind as to the condition of the circuit under test. What is to be expected on the various circuits under different circumstances are matters which need careful explanation. These things are learned by experience, but when the apprentice finds himself at a busy test board, attempting to handle a rush of important work, his experience is sometimes costly.

Such was the case of the man in our story. One day a troubleman had been given a case of trouble which showed a "short" on a long ten-party line. As the troubleman was starting out on this case, he asked for a test of the line in question. The assistant wire chief, being at the board, gave the desired test and the voltmeter indicated the "short" as being still on the line. After several hours' work on this line, the trouble was found to be "R. O. H.", which any one familiar with the code will recognize as a receiver off the hook.

Here was a case where the tester had not had sufficient experience to tell the difference between a receiver off the hook and a "short" on the line.

The next case which got our friend in trouble was when he kept an installer waiting several hours to test out a new installation. The orders for running the jumpers in the office had been received and the jumpers had been run and were supposed to have been tested out to make sure the work was O. K. But through the fault of the wire chief, this test was not made and there was a bad pair in one of the cables through which this circuit was connected. When the installer had his instrument connected, he found the line dead, and reported this to the assistant who was alone in the office at the time.

The test board was so very busy that it could not be left for more than a minute or two at a time, so by the time the trouble was located and steps taken to get a helper to make the proper connection in the cables, the installer had had a good long rest, at 50 cents per hour, and the trouble had been reported to the officials of just about every department connected with the telephone company.

The cause of this delay was no fault of the assistant, but being the new man on the job, he had to be the "goat."

Various complaints were going to headquarters at this

time by the troublemen, about having to wait too long for a test, or about getting poor tests, many of which were not the fault of the assistant trouble tester, but all of which were credited to him.

There seems to be a spirit among many men, when they are working with a man who is new in his position and needs a little help, to make the work harder for him instead of doing what they can to help him out. Such was the condition in the case we are considering. The men connected with this office did not waste much time attempting to help the new assistant out of any of his difficulties. They lost no time whatever in getting to headquarters with a strong "kick" over any real or imaginary cause for complaint.

The case of trouble which caused the downfall of our trouble tester soon came. One morning some trouble showed up on several lines, all of which ran out into the country on the same pole line and, of course, came in through the same cable. This cable had been showing more or less trouble and all available pairs were in use. A troubleman was sent out. When he called in for a test from the cable terminal, the wire chief was otherwise engaged, so the assistant made the test. In doing so he made a most serious error, but one which any apprentice tester is liable to make when working under pressure of too much work.

He found these circuits showing heavy grounds when open at the terminal, but here is the reason for it: The lines showing the trouble were all on the "hospital board," which means that to prevent them from showing permanent signals at the line lamps of the main board, they were connected through to the "hospital" section of the wire chief's board, where he could have supervision over them.

On the morning when the test was made, the trouble tester was just about covered up with work. Since he had not been on the job long enough to get over his nervousness, he was liable to pull off almost any kind of a stunt. This is what he did: Instead of locating these circuits under test, on the "hospital" where he could have plugged in with his test plug and made the test, he ordered up a test cord connection on a multiple of these circuits on the "B" board, while they were still on the "hospital." This put battery on the lines under test and this battery through his voltmeter caused him to think the circuits were still in trouble.

Well, the trouble was reported as cable trouble and was turned over to the cable department. This department sent out a tester, splicer and helper seven miles to get this trouble, which when they got there could not be found, as the circuits tested O. K. By this time it was too late in the day to send out a troubleman, so it had to go over until the next day, leaving 30 or 40 subscribers out of service for another day.

Dismissal of the Assistant Wire Chief.

That test was the finish of our trouble tester. His resignation was demanded, and he made his exit.

Now the question arises: Was the apprentice entirely responsible for his poor work? It should be explained that almost all of his faulty work occurred during three or four rush periods when he had been left in charge of a test board which was a two-position board and easily kept two men busy during a rush of business.

There is no question that the assistant was at fault, but not so much at fault as the wire chief in charge of the office. Had he given sufficient attention to "breaking in" his helper, the results would have been very different. But being in a new position himself, he had not adjusted himself to the new conditions sufficiently to realize the importance of every part of his many duties.

There are many excellent workmen who are not successful in teaching other men to do work at which they are expert. When a man has learned a certain line of work and is put in charge of other men doing the same kind of work, he must then learn how to handle these men to accomplish what he could do easily himself. Many first class linemen are spoiled by making them foremen, and this is true of inside men also. A good tester and switchboard troubleman may not be a success as a wire chief.

A great deal of the responsibility for the failure of this apprentice to make good must rest on the officials who were in authority over all employes of these branch offices. An official who employs men to fill any position, should be responsible for a certain amount of supervision over those men. To select the most available man for a position and then leave him to make good or fail, is an injustice to the employe as well as to the company employing him. While most organizations have some method or system of training for their new employes, there should be supervision enough for officials to know whether that system is working out in a proper manner, and, if not, to find the causes for the trouble.

In the case of the apprentice whom we have been considering, he was just getting himself adjusted to conditions, so that he would have been of some value to his employers. His mistakes had each taught him a lesson which would have made a repetition of the same mistake almost an impossibility. A thorough explanation to him of the tests which later caused him trouble, would very likely have prevented many of his troubles. As it was this man went out under a cloud, and the employing company was back where it was before employing him. It had the trouble and expense of selecting and breaking in another man, who, under the same treatment, undoubtedly would have repeated a great deal of the poor work of his successor.

The moral of this story, or sermon, is that we should be careful how we handle our apprentices and give them a square deal. Find out if they are getting proper coaching and, if not, see that they get it. Every man should get rid of the idea that he has a cinch on the knowledge of any line. But if he has anything which someone else needs, he should share his knowledge without thinking that he is the loser.

Correspondence Course in Telephony.

Telephony by correspondence is a new course offered by the extension division of the University of Wisconsin, and 36 employes of telephone companies in Wisconsin have already enrolled for the study of telephone methods and apparatus. These courses discuss the practical problems of the telephone business, and by their aid the men are enabled to gain a more thorough understanding of their work and to improve their chances for advancement.

Considerable interest in the courses is shown by the Wisconsin Telephone Co., and as many of its men as possible will be urged to enroll. The supply houses are also interested and some have sent handbooks to be used by the students. At present a reorganization of the courses is under way. The Independent and the Bell companies are supplying all possible information to assure a practical line of study. The new courses will be divided into three sections, all or one of which may be taken, and a larger enrollment is expected to result.

New Exchange Nearing Completion at Centerville, Iowa.

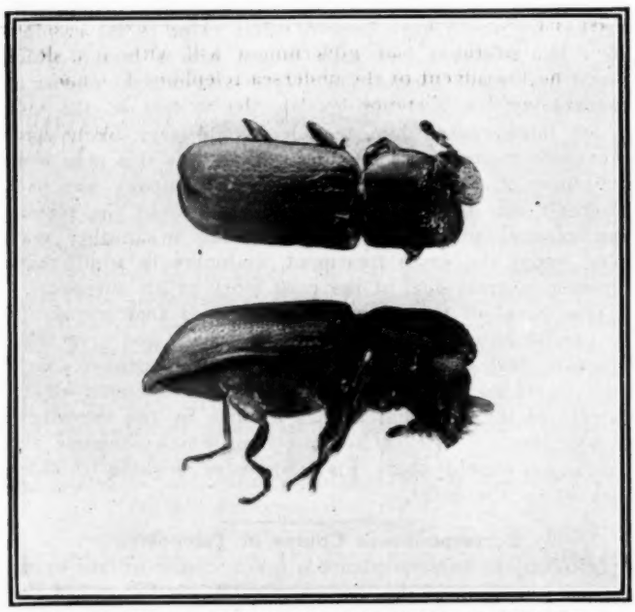
Work is nearing completion on the new exchange of the Appanoose County Telephone Co., at Centerville, Iowa, and it is expected that the new system will be in operation this month. The new building is a two-story fireproof structure of brick and hollow tile, with reinforced concrete floors. The operating room will be located on the second floor, where a new Garford common battery board will be installed. The outside plant is also being improved.

More Data Relative to the California Cable Bug

Experiences of the Shanghai (China) Telephone Co. with the Cable Bug—Photograph of Bug Taken by Entomologist of California University—Precautions Taken by the Public Works Department of Australia to Prevent White Ants From Destroying Lead Cable Sheaths

E. O. Essig, entomologist at the University of California, took the accompanying picture for us of the famous cable bug. The line where the bug sticks his head out of his shell, similar to the way a turtle does, is shown very clearly. This bug, however, has a faculty of turning that portion of his head around as though it were hung on a pivot. The photograph shows the head or boring apparatus, only partly protruded.

In drilling the holes through the lead telephone cable armour, the bug keeps protruding this portion of his head as the hole deepens and turns his head around from side to side so as to work very similar to the way a drill would work. We have repeatedly watched him at work on lead



Greatly Enlarged Photograph of the California Cable Bug.

boxes in which we have placed the captured bugs. They seem to be most active along the fall of the year here at Santa Barbara.

We painted about 1,000 feet of one of our cables with P. & B. paint last fall. Upon examining it a short time later, we found that over 100 of these bugs had become fastened into that paint and had died. There are a few scattered bugs still at work, but we have not captured any since the last two which we sent you. We will advise you of any new developments.

Santa Barbara, Cal. Albert Schuler.

The accompanying letter just received by Mr. Schuler from G. L. Oberg, of Shanghai, China, secretary and general manager of the Shanghai Telephone Co., is very interesting.

"In reply to your letter of November 9 regarding a bug eating holes in our telephone cables, I beg to say that the bug in question is a wood cutter bee called in Latin *Xylocopa Nolacia*. It is a genuine bee, one of the family of *Hymenoptera* and has given us a lot of trouble. Every year they perforate some of our overhead cables. When the rain comes, the water gets in the cables and that is the first notice we have of the damage done. As the bamboo trees are being cut down around Shanghai, these insects are decreasing. I have no remedy against them except cutting away the bamboos in the vicinity of the cables.

The reason why they attack the cable is that they mistake it for a bamboo tree, wishing to make a hole for their eggs to be placed in. Specimens of these bees are now to be found in our museum and I dare say, if you want one, we shall be able to send you one when the season, which is during the month of July for about three weeks, comes on again. The rest of the year we are not troubled."

Mr. Schuler wrote to the Public Works Department, New South Wales, Australia, and recently received a reply to his letter. The director general of the Public Works Department sent Mr. Schuler copies of communications received from the railway and postal departments of New South Wales. J. S. Spurway, secretary of the department, wrote as follows:

"This department has experienced no difficulty with aerial lead covered cables, but considerable trouble has been experienced with white ants destroying the wood troughing and perforating the lead covering of underground cables, also with their attacks on wood poles. Attached is a statement of the precautions now taken in the department. It may be mentioned that the treatment for solid laid cables has proved absolutely effective in overcoming a trouble which had previously proved extremely costly.

The trouble being experienced with the cables in California may, it is thought, be due to what is known in this country as the 'borer,' a small round worm about one-quarter of an inch in length, which attacks metals in the manner stated. Considerable difficulty is experienced with this insect in the north of Queensland, and it is stated that it destroys galvanized iron tanks by eating numerous holes through them. Although this department has had no experience of this nature, it is understood that a P. & B. compound diluted with Stockholm tar, with arsenic added, about one pound to the gallon, is effective against this insect. It is also stated that a wash of strychnine is very effective, but, owing to its poisonous nature, extreme care needs to be exercised in its use.

A somewhat similar trouble to that referred to by the company was experienced by the postal department in Queensland, and was a matter to which special attention was drawn by Mr. Hesketh, chief electrical engineer of the post office, who wrote a paper on the subject, which was read before the St. Louis convention of 1904."

PROTECTING CABLES AND POLES FROM WHITE ANTS.

"CABLES: Cables are solid laid in hardwood boxes filled with bitumen to which arsenic has been added in the proportion of one-half pound of arsenic to one cubic foot of bitumen; and arsenic, to the proportion of one ounce to the square foot, is sprinkled on the surface of the bitumen after the latter has cooled. The wood is also impregnated throughout with arsenic by means of the Powell process.

POLES; TREATMENT BEFORE ERECTION: All the poles before erection are treated with a compound, particulars of which are given hereunder, before erection, and the bases are encased in concrete of a minimum thickness of four inches; the foot of the pole resting on a bed of concrete also four inches. This is to prevent white ants from entering the pole at the foot. This composition is placed on the pole around the butt to a point six inches above the ground line.

Two mixtures of compound are used for treating poles, either of which is effective. One, 'Antibane' is a secret composition prepared by a Sydney firm, but the department adds one-quarter of a pound of arsenic to each gallon of 'Antibane.'

The other compound is as follows: Stockholm tar, one pint; coal tar, one gallon; bitumen, five pounds; kerosene, one-half pint; resin oil, one pint; and arsenic, one-quarter pound.

PRECAUTIONS TAKEN IN THE USE OF ARSENIC: (a). All stocks of arsenic must be kept under lock and key, except when actually in use. The stocks at the depot must be kept under the sole control of the storeman, and the stocks on the work must be kept under the sole control of the ganger, who is to see that it is safely locked up when not in use.

(b). The arsenic is to be placed in the hot bitumen after the latter has been poured in to the bucket from the boiler. One man is to be placed in charge of the arsenic at each boiler. This man is to mix the arsenic with the bitumen in the proportion of half a pound of arsenic to one cubic foot of bitumen. Men specially trained for mixing the arsenic with the bitumen are also to be employed to sprinkle the arsenic on the surface of the bitumen. No men, other than those above mentioned, are to handle the arsenic in any way whatever.

(c). All vessels containing the arsenic, whether in large or small quantities, must be clearly labeled 'Poison—Arsenic' in red letters.

(d). All men handling the arsenic must be warned against its careless use, and that before handling tobacco or food, the hands should be thoroughly washed.

(e). Arsenic powder must only be placed on the surface of the compound when everything is ready for the cover-board to be put on. Care must be exercised to see that the powdered arsenic does not blow about with the wind.

(f). All men, before handling arsenic, must sign a copy of the following form:

Precaution Taken in the Use of Arsenic.

I, _____, have received a copy of the foregoing instructions, with reference to the use of arsenic, and am aware of the poisonous nature of the material, and the necessity for the greatest care being exercised when using it.

(Signature.)

Witness: (Date.)"

The letter from the postal department says:

"The insect referred to is known here, and details in connection with the subject are given in Kempster B. Miller's book, American Telephone Practice, 4th Edition (1905), page 811.

The means adopted in this country to combat the trouble is for a wrapping of copper or brass ribbon, through which the insect cannot bore, to be placed between the core of insulated conductors and the lead sheathing of the cable."

Proposed Undersea Telephone Line From U. S. to Cuba.

Arrangements are being made by the American Telephone & Telegraph Co. with the Cuban government for the first undersea telephone line connecting the United States with Cuba. At a banquet of the A. T. & T. Co., held recently in Jacksonville, Fla., at which the matter was discussed, Cuban Consul R. M. Ybor expressed the opinion that the Cuban government will without a doubt welcome the advent of the undersea telephone line and give every possible assistance to the telephone company. Mr. Ybor was commissioned to take the matter up with the government at once and pave the way for the steps that will have to be taken.

Under the proposed plans the A. T. & T. Co. will extend a line down the east coast of Florida to Key West and from that point lay a cable across the Florida straits, a distance of some 90 miles, thus bringing Cuba and the United States into communication by telephone.

Proceedings Before Commissions, Courts and Councils

Discussions and Rulings of State Bodies Having Supervision Over Telephone Companies, Decisions of Courts in Matters of Interest to Public Utilities and Actions of City Councils Relative to Franchises, Rates and Service

Proposed Transfer of Massachusetts Commission Functions.

Although little has appeared to this effect in the press, a movement to transfer the supervisory powers of the Massachusetts Public Service Commission as regards telephone and telegraph companies to the Board of Gas & Electric Light Commissioners is taking shape in the inner councils of the present legislature. If the project is being launched in the interests of economy, it is likely to be of doubtful success, for the addition of a telephone and telegraph department to the gas and electric light commission would necessitate a reorganization of the office of the latter, and its withdrawal from the public service board, according to Chairman F. J. McLeod, of the public service commission, would hardly justify a reduction in the membership of the latter, considering the other demands upon the commission.

The fact is that the telephone department of the public service commission has made a splendid record for itself and has developed from small beginnings to one of the most valuable adjuncts of the state's regulative machinery right in its present location. The public has come to appreciate its services as a part of this particular board's large field of usefulness, and under the present administration.

W. H. O'Brien, chief of the telephone and telegraph department, and his two assistants are given a latitude in their work which it would be a real misfortune to disturb. Assuming that the transfer might be made without change in departmental administration, there would nevertheless result a certain loss in regulative momentum from the public point of view which would be a genuine mistake, not only to the public but to the companies. For the latter are the beneficiaries of the regulative policies exemplified in the Massachusetts commission's telephone department no less than the former, and to uproot the good work done (and to which so much space has been given in TELEPHONY during the past year) in the interests of a transfer for theoretical economy of state administration, would be, it is believed, a step in the wrong direction and one which would require a long time to retrace.

Controversy Over Kentucky Railroad Rights-of-Way.

Following the finding of the United States district court at Louisville, Ky., which gave the Louisville & Nashville Railroad a judgment for $5,000 for the property used by the Western Union Telegraph Co.'s wires and poles on the 900-odd miles of L. & N. right of way, a controversy has developed. It relates to the bill introduced in the senate of the state legislature by Sam Robertson, Louisville (Senate Bill No. 347), prohibiting condemnation of rights of way for pole and wire lines over railway rights of way.

Overton Harris, attorney for the Western Union, called attention to the bill, in a communication to the Louisville Board of Trade, stating that an attempt was be-

ing made to "railroad" the measure through the legislature and thus undo the decision of the federal court. For the L. & N. it was replied next day in communications in the papers, addressed to the public and the legislature, that the original measure authorizing such condemnation was slipped through by the Western Union in 1898. This communication was from W. L. Mapother, first vice-president of the L. & N. Daily interchanges, promulgated at advertising rates, have continued, in which the merits of the case of each side are gone into in detail. It was stated for the L. & N. however, that the decision of the Kentucky court would be appealed from.

Rate Increase at Astoria, Ill.

The Illinois Public Utilities Commission, on February 17, granted the petition of the Astoria Telephone Exchange, Astoria, Ill., for an increase in rates, it being found that its present rates yielded only a return of 4.7 per cent. on the present value of the property. The new rate schedule authorized by the commission and estimated to give a return of 7.8 per cent., follows:

	Per Year.
Individual line business telephones	$24
Individual line business telephones (desk set)	27
Two-party line business telephones	21
Two-party line business telephones (desk set)	24
Individual line residence telephones	18
Individual line residence telephones (desk set)	21
Two-party line residence telephones	15
Two-party line residence telephones (desk set)	18
Extension telephones	9
Rural service lines (minimum rate)	14
Rural service station	3.50

The rural rates are subject to a discount of $1 per year if paid at the company's office semi-annually during the first month of each six months' period. All other rates are subject to a discount of 25 cents per month if paid at the company's office on or before the fifteenth day of the current month. This new rate schedule became effective March 1.

Higher Standards in Rate Regulation.

Before a committee of the Massachusetts legislature recently, Hon. F. J. McLeod, chairman of the Massachusetts Public Service Commission, stated that the time has passed when any two, three or five men sitting in a rate case can maintain that a certain charge for service is proper without giving the public the facts and reasoning upon which the decision is based. Mr. McLeod said that the act of 1913, which established the commission and eliminated the former railroad commission increased the work of the new board ten-fold because of the rate-fixing authority granted the latter.

In every rate case an exhaustive investigation of the utility by the accounting and engineering departments is necessary, and only a small part of the work of those departments now pertains to checking up security issues. The chairman said that the transfer of telephone and telegraph supervision from the highway commission to the public service board was only in a minor degree responsible for the increase in membership from three to five commissioners.

The legislature has not as yet acted upon the resolve appropriating funds to enable the commission to make a thorough investigation of the rates of the New England Telephone & Telegraph Co., and will probably not do so until a decision is reached relative to the proposed transfer of the commission's telephone and telegraph department to the gas and electric light commission.

Long Prairie (Minn.) Company Permitted to Increase Rates.

The Minnesota Railroad & Warehouse Commission, on February 24, issued its first order fixing rates under the Minnette law, in the matter of the application of the Long Prairie Telephone Co. to increase its local exchange rates at Long Prairie.

A complete physical valuation of the plant was made by the commission and the books and records of the company were also examined. The commission found that the plant was bought by Joseph Kraker for $6,700, but since that time extensive changes and improvements have been made to the plant. The physical valuation, according to figures submitted by the commission's engineers, was found to be $11,977. On the present rates, it was found that the company received no return on its investment, after allowing for depreciation. The old rates of the company are as follows:

Single line business telephone, $2.25 per month.
Single line residence telephone, $1.25 per month.
Two-party residence telephone, $1.25 per month.

These rates were subject to a discount of 25 cents if payment was made on or before the 15th of the month.

The new schedule of rates, which became effective March 1, is estimated to give a return of approximately 6 per cent. on the valuation of the property, allowing 8.938 per cent. for depreciation. The new rates, as authorized by the commission, follow:

Business, one-party, $2.75 per month.
Residence, one-party, $1.50 per month.
Residence, two-party, $1.25 per month.
Business extension sets 50 cents per month net.
Residence extension sets, 25 cents per month net.

A discount of 25 cents per month is made on the above rates if paid on or before the 15th of the month in which the service is rendered.

To Appeal to U. S. Supreme Court in Columbus Case.

When Judge Dillon in common pleas court, at Columbus, Ohio, overruled a demurrer filed by the Columbus Citizens' Telephone Co. to the city's petition to recover $71,393 and interest, said to be due in royalties for the years 1904 to 1914, attorneys for the Ohio State Telephone Co., successor to the original company, declared they will carry the fight to the United States Supreme Court in an effort to have the 25-year contract entered into with the city in 1899 declared void.

When the Columbus Citizens' Telephone Co. was granted a franchise in 1899 by the board of public works, which then existed, it agreed to pay the city a certain percentage of gross receipts annually. After three years the company refused further payments. Suit for payment was brought by the city in 1914. The case was carried to supreme court, where it was decided, as in lower courts, in favor of the city.

The telephone company claims the city was virtually taxing it, and the franchise should be thrown out for this reason. Other contentions were that the territory of the city has expanded, that the royalties were excessive, and the company had more than repaid the city by aiding in police and fire protection. The supreme court ruled against them in each instance.

In its last attempt to avoid judgment since 1903 the company contended the board of public works, which granted the franchise, was not a legally constituted board. Judge Dillon declared the company is in no position to question such legality, as all its privileges were founded on the action of that body.

Ruling in Dubuque (Iowa) Franchise Case.

A decision that conforms with one rendered by the Iowa Supreme Court and also with one handed down by Judge Martin J. Wade, of the United States Court for the southern district of Iowa, was rendered by Judge Robert Bonson in the Dubuque county district court, February 19, on a demurrer in the case of the city of Dubuque vs. the Iowa Telephone Co. The city's demurrer to the answer filed

in the case by the defendant was overruled by Judge Bonson.

The suit was brought by the city to secure an injunction restraining the telephone company from occupying the streets and alleys of the city with their poles, wires, etc., without securing a franchise from the city, and also an order providing for the removal of the telephone equipment on the grounds that it was occupying the streets and alleys unlawfully. A lengthy answer to the petition was filed by the defendant and the city demurred to it.

Judge Bonson's ruling on the demurrer sustains the contentions of the telephone company, and in this respect follows out decisions handed down in similar cases brought by other cities. Des Moines had the same kind of an action up against the Iowa Telephone Co., and the case was carried to the supreme court. The higher court handed down a ruling practically identical with the one given by Judge Bonson. The case is still pending in the supreme court, because of a petition for a rehearing.

The defendant's main contention is that it is operating under a grant that was given to it in 1882, which it claims is equivalent to a perpetual franchise in Iowa. This grant, the company contends, was in the nature of a contract and gives the company a constitutional right that the legislature or courts cannot interfere with. To do so, the defendant alleges, would be to practically confiscate the company's holdings without due return for the losses it would sustain.

The company's answer to the original petition drew a demurrer from the city in which twenty-seven grounds were stated. The gist of these grounds was that the legislature in 1897 passed a statute delegating to cities the right to require franchises from telephone companies and to regulate them; that the telephone company is a corporation and is subject to legislative control just like other corporations; that the grant given to the company in 1882 was given at a time when there was a statute in Iowa which provided that all grants and all franchises were subject to legislative control; that the company knew of this provision of the Iowa laws when it accepted the grant in 1882 and that the statute of 1897 was simply one in conformity to the rights of the legislature under the other statute.

These grounds are identical with those which the city of Des Moines set forth in attempting to force the telephone company to take a franchise there. The same grounds were made the basis of similar suits brought by other cities.

In the Dubuque demurrer, the additional contention was made by the plaintiff that Dubuque is a special charter city and is not affected by the statute of 1882 which gave the Iowa Telephone Co. the rights in this state that it claims. The city contended that a statute is not applicable to special charter cities unless the provision is contained in it that it shall be applicable to them. Such a provision is not contained in the statute of 1882.

It is only in regard to the special charter city contention that the Dubuque action differs materially from those in which other cities are attempting to force the telephone company to secure franchises.

Increase in Business Rates in St. Louis, Mo.

The Southwestern Telegraph & Telephone Co. was given permission, on February 23, by the public service commission to put into effect April 1 a modified schedule of increased rates on business telephones in St. Louis, Mo. The schedule will be tried for a year to determine whether under it the company can obtain the increased revenue it holds is necessary. The schedule increases the unlimited service direct-line business rate from $78 to $96 a year.

At a hearing before the commission on February 15, the company submitted a schedule calling for an annual rate of $108 a year for unlimited business telephones and $45 as the lowest annual rate on measured service. The commission refused to approve the $108 rate for unlimited service and objected also to the private branch exchange rate as being too high. Chairman Atkinson of the public service commission suggested a $96 rate.

The company's rate schedule as approved by the commission follows: Unlimited direct line, $96. Measured service: Two-party line, 720 messages, $39 annually; direct line, 840 messages, $45; 1,200 messages, $60; 1,500 messages, $69; 1,800 messages, $98.

Extra messages upon the last three classes of service are charged at 4 cents each and upon the first two, 5 cents each. Additional messages above 1,800, if contracted for in lots of 300, cost $9 per 300-lot.

The commercial unlimited private branch exchanges will be $324 a year, and the measured service $183.

The business semi-automatic unlimited service is fixed at $174 annually, and measured service of this character at $132 a year.

Protection for Investor Not Primary Object in Michigan.

According to Attorney General Fellows of Michigan, it is within the province of the Michigan Railroad Commission to inquire into the reasonable certainty of stocks and bonds authorized by the commission paying the interest or dividends, and the primary object of the law is not the protection of the investing public but the extension of public utilities within reasonable limits and on reasonably safe grounds.

Summary of State Commission Hearings and Rulings.

COLORADO.

February 28: Continued hearing on the investigation of the Mountain States Telephone & Telegraph Co. in the state of Colorado.

IDAHO.

February: Application filed by the Long Valley Telephone Co., of Roseberry, Idaho, for permission to increase its rates from $2 per quarter to $1 per month.

ILLINOIS.

February 17: The commission authorized the Astoria Telephone Exchange, Astoria, Ill., to put into effect on March 1 a new rate schedule, it being found that the old rates of the company yielded but 4.7 per cent. return on the present value of the plant. The new rate schedule, it is estimated, will give a return of 7.8 per cent.

February 28: Hearing on application of the Blue Mound Telephone Co. and Albert A. McClure and Jas. A. McClure for approval of the sale of the undivided one-half interest in the Blue Mound Telephone Co., for $10,000 and on application for approval of contract of purchase of Blue Mound Telephone Co., by Albert W. McClure and Jas. A. McClure.

February 28: Hearing on complaint of the Wayne County Mutual Telephone Co., and the Business Men's Commercial Club of Fairfield, Ill., vs. the Commercial Telephone & Telegraph Co., in regard to charges and insufficient service in the city of Fairfield and vicinity. Included also is a request that the petitioners be granted a certificate of convenience and necessity to install within the city of Fairfield another proper and efficient telephone system. The hearing was set on application of time to comply with the order of the commission dated August 25, 1915.

March 1: Hearing on application of John A. Kugler, of Okawville, Ill., to increase telephone rates at Okawville.

March 1: Hearing on application of the Carrier Mills Independent Telephone Co., for authority to change telephone rates at Carrier Mills and vicinity.

March 1: Hearing on application of Abingdon Home Telephone Co. for authority to change rules and regulations with respect to payments and discounts at Abingdon and vicinity.

INDIANA.

February 23: The commission granted permission to the American Telephone & Telegraph Co. to "construct, maintain and operate" additional construction and equipment "reasonably necessary" to enable the company to place cables in existing conduits of the Chicago Telephone Co. for a "through line from East Chicago and one loop therefrom."

February 28: Hearing on petition of the Home Telephone Co., of Elkhart County, Elkhart, Ind., asking that it be permitted to abolish free service between Elkhart and Goshen and to establish a charge of 10 cents for each message.

March 1: Postponed hearing on the complaint of the Martinsville (Ind.) Chamber of Commerce against the Martinsville Telephone Co., alleging poor service.

March 1: Hearing on petition for approval of the merger of the New Long Distance Telephone Co., the New Telephone Co. and the Indianapolis Telephone Co., of Indianapolis, Ind.

IOWA.

March 16: General hearing on the subject of interference of high tension lines with telephone and telegraph lines.

KANSAS.

February 18: Application filed by the Geneseo (Kan.) Telephone Co. for permission to establish a rate of 50 cents per month for extension telephones.

February 18: Application filed by the White Water (Kan.) Telephone Co. for permission to increase its rates 25 cents per month. In asking for the increase the company states that its properties were damaged to the extent of more than $5,000 by a recent sleet storm. The White Water company has about 800 subscribers, of whom 600 are stockholders. At a recent meeting of the stockholders, a resolution agreeing to the 25-cent increase was adopted.

MICHIGAN.

March 1: Final hearing of the Michigan State Telephone Co.'s application for metered rates in the Detroit metropolitan zone.

MINNESOTA.

February 24: The commission authorized the Alvarado (Minn.) Telephone Co. to purchase the local exchange of the Warren (Minn.) Telephone Co. in the village of Alvarado for the sum of $1,200. The Alvarado company, the commission finds, purposes to perform such reconstruction and make such extensions as are necessary to improve the plant and give the subscribers better service than they now enjoy.

February 24: The commission, after making a physical valuation of the plant and examining the books and records, authorized the Long Prairie Telephone Co. to increase its local exchange rates at Long Prairie, Minn. An increase of 50 cents is ordered for business telephones and an increase of 25 cents for single line residence service. This increase, it is estimated, will give a return of 6 per cent. on the valuation of the property, allowing 8 per cent. for depreciation. The order became effective March 1.

March 3: Hearing on application of the Northwestern Telephone Exchange Co. to purchase the majority of the stock of the Citizens Telephone Co., of Montevido, Minn.

MISSOURI.

February 23: The commission authorized the Southwestern Telegraph & Telephone Co. to put into effect April 1 a modified schedule of increased rates on business telephones in St. Louis which, it is estimated, will increase the company's revenue $105,000 annually. The modified schedule increases the unlimited service direct-line business rate from $78 to $96 a year. The schedule will be tried for a year to determine whether under it the company can obtain the increased revenue it holds is necessary.

NEBRASKA.

February 25: Postponed hearing on the application of the Lincoln Telephone & Telegraph Co. for permission to increase its farm line rate at Wahoo, Neb., from $1 to $1.25.

NEW YORK.

February: Hearing of complaint of subscribers on the Deansboro, Oneida county, telephone exchange against the Waterville Telephone Co. protesting against alleged proposed discontinuance of the Deansboro exchange, and alleging that said exchange should be enlarged.

February 28: Hearing of complaint of Wm. J. Berkson, of New Rochelle, against New York Telephone Co. as to charge for short-term telephone service in Port Chester, the service having been ordered discontinued.

OHIO.

February 24: The commission granted authority to the Perry County Telephone Co., of New Lexington, Ohio, to issue $16,850 in common stock and $10,000 in three-year, 6 per cent. notes in reimbursement for moneys actually expended from income within the period June 30, 1906, to September 30, 1915, for the construction of additions, extensions and improvements to its plant and system, which moneys the stockholders might have received in dividends as a return upon their investments.

February 24: The commission authorized the Carroll (Ohio) Telephone Co. to issue to its stockholders $4,500 in three-year, 6 per cent. notes in reimbursement for moneys actually expended from income within the period July 8, 1914, to September 30, 1915, for the construction of additions, extensions and improvements to its plant, which moneys might have been received by the stockholders in dividends as a return upon their investments.

February 24: Rushville Bell Telephone Co., of Rushville, Ohio, authorized to issue $1,700 in common stock and $1,250 in its three-year, 6 per cent. notes in reimbursement for moneys actually expended from income for the construction of additions, extensions and improvements to the company's facilities.

February 24: The commission approved the issue by the Sugar Grove (Ohio) Telephone Co. of $1,800 of its common stock and $2,000 in three-year, 6 per cent. notes in reimbursement for moneys actually expended from income for the construction of additions, extensions and improvements to its plant.

February 24: The commission granted the application of the Frazeysburg Bell Telephone Co., of Frazeysburg, Ohio, for permission to issue $2,400 of its common stock in reimbursement for moneys actually expended from income for the construction of additions, extensions and improvements to its plant.

February 25: The commission granted the joint application of the Clinton Air Line Telephone Co. to sell and the Greenwich Farmers Telephone Co. to purchase the exchange of the former company in the village of Greenwich, and the lines and certain property connected therewith.

February 25: The commission authorized the Greenwich Farmers Telephone Co. to issue 170 shares of its common capital stock of the par value of $20 to pay for the property of the Clinton Air Line Telephone Co., of Greenwich, authorized in the preceding order.

March 7: Hearing of complaint of T. R. Plank, M. Farnsworth, A. H. McKitrick, E. A. Wiley, D. H. Sloan and others from the vicinity of Ashland against the Star Telephone Co. The complainants set forth that certain rates of the telephone company are excessive and discriminatory, also that the service on certain lines is inadequate.

March 13: Postponed hearing on the protest of the Lima (Ohio) Telephone & Telegraph Co. against the tentative valuation of its property by the commission. This case was to have been heard February 28 but was postponed because of the inability to complete necessary investigation to permit of the resumption of the hearing.

May 3: Postponed hearing on the protest of the Cleveland (Ohio) Telephone Co. against the tentative valuation of its property by the commission. This case was to have been heard March 9 but was postponed because of the disability of the director of law, Mr. Fitzgerald, of Cleveland.

OKLAHOMA.

February 17: The Fort Supply Telephone & Telegraph Co., of Forgan, Okla., filed a complaint against the Pioneer Telephone & Telegraph Co., which also operates an exchange in Forgan, asking that the Pioneer company be compelled to raise its rates to the schedule which it formerly maintained. The complainant alleges that until the Pioneer company lowered its rate on residence and business telephones to $1 per month, the rates charged by both companies were the same, that is, $1.25 per month for residence telephones and $2 for business telephones.

PENNSYLVANIA.

February 16: The commission approved the reorganization of the Cumberland Valley Telephone & Telegraph Co., of Harrisburg, Pa.

VERMONT.

March 3: Hearing on petition of the Bethel (Vt.) Telephone & Telegraph Co. for permission to increase its capital stock from $10,000 maximum to $50,000 maximum.

WASHINGTON.

March 14: The Washington Public Service Commission will resume its hearing on the investigation of the Pacific Telephone & Telegraph Co. on this date and not February 23 as previously announced. The hearing has been delayed in order to give the engineers for the commission and for the company time to check over their appraisement and reproduction figures which showed wide variance.

WISCONSIN.

February 24: Hearing on application of the Beef River Valley Telephone Co. for authority to increase rates. U—880.

February 25: Hearing in the case of the Rosendale Telephone Co. vs. the Wisconsin Telephone Co. as to rates and service. U—708.

February 29: Hearing on application of Baldwin's Mills Telephone Co. for permission to increase rates. U—881.

February 29: Hearing in the case of the City of Lancaster vs. the Wisconsin Telephone Co. and the Farmers Telephone Co., relative to physical connection, scheduled to have been held on this date, has been indefinitely postponed. U—871.

Fundamental Principles of the Telephone Business

A Reading Course Designed to Present Logically the Principles Which Underlie Successful Organization and Operation of Telephone Properties—Prepared Under the General Supervision of Stanley R. Edwards—Part I, Telephone Economics, by James H. Shoemaker, Completed June 26, 1915—Part II, The Corporate Telephone Organization, by J. C. Kelsey and S. R. Edwards, Completed September 25, 1915—Part III, Telephone Accounting and Auditing, by James H. Shoemaker, Completed January 15, 1916—Installments Now Being Presented Comprise Part IV, Telephone Finance, Written by J. C. Kelsey and S. R. Edwards

Quiz Questions on the Preceding Installment.

20. Why is the relation between quick assets and quick liabilities an important one? What is the conservative limit of quick liabilities to quick assets?

31. What is the usual purpose behind an issue of short-time notes?

32. State the precautions to be observed regarding note issues. What is the general opinion as to issuing notes?

33. What is the purpose of bonds? What determines their value?

34. State two general classes of bonds and define each class. Name a disadvantage of registered bonds.

35. What are the denominations of bonds? State factors having an influence on the life of bonds.

36. What is the purpose of gold bonds?

37. Cite an example of the misnaming of bonds.

CHAPTER IV. Long Time Loans (Continued).

38. *Varieties of Long-Term Bonds.*—Long-term bonds are of two varieties:

First, those without specific security known as debentures.

Second, those with specific security, such as first mortgage bonds, collateral trust bonds and car trust or equipment certificates.

Fashions change in bond issues just as surely as in house-building and women's hats. There are periods when long-life bonds are the rule, as is shown by the West Shore Railroad bonds which fall due in 2245 A. D.—a time when no man alive, today, can profit by them. There are other times when the short-life security will be the rule, bonds falling due in twenty, thirty and forty years.

Sometimes bonds with privileges of redemption appeal to investors, although the right of redemption has been found to be somewhat of a disadvantage. This explains why bonds may be redeemed at a premium, at such a price as 104 to 110.

Bonds without specified security are not generally familiar to telephone men. They are known as debentures, particularly of late in the form of convertible bonds which will be discussed later. The American Telephone & Telegraph Co. did finance at one period with a limited issue of convertible bonds. To railroad men, this form is quite well known. The practice is recognized in England, but American practice seems to be committed to the idea of specific security. In fact, our laws stipulate first mortgage bonds as legal investments for savings banks and trust funds.

39. *Classes of Enterprises Which Seek Borrowed Funds.*—Before going into a study of the different types of bonds, it is well to take a glance at the various and numerous enterprises which seek to borrow money. The accompanying table is instructive for that purpose.

40. *Elements of the Ideal Investment.*—The ideal investment has ten elements. They are:

1. Security of principal.
2. Stability of income.
3. Proper return.
4. Marketability.
5. Value as collateral.
6. Tax exemption.
7. Freedom from worry and care.
8. Duration.
9. Denomination.
10. Speculative possibility of appreciation in value.

One might say as did the boy when he first saw a giraffe: "There ain't no such animal." No bond has been found which

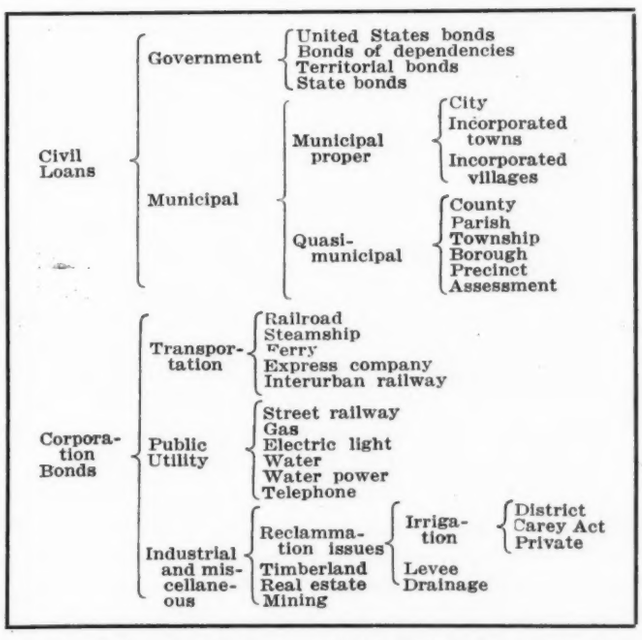


Table of Classes of Enterprises Which Seek to Borrow Funds.

meets all the ideal requirements, and it is customary to make security, income, and marketability the principal features.

If an investment is ideal, it cannot return a high rate of interest and have a good market because such a combination will

force up the price and lower the income. Here is where the bondhouse comes in. It sells bonds of unquestioned security with a high income because the issues are sold before they become well enough known to command a higher price and thereby lower the income.

The first class given in the table—civil loans—represents the extreme of security at the expense of income. The public service corporation bonds stand at the opposite extreme in respect to income, regardless of market, yet with reasonable security. The middle ground is covered by transportation bonds, which offer less security than civil loans, more than public utility loans, and which incline toward marketability rather than income which may be offered.

41. *Civil Loans.*—Although civil loans are highly regarded now, such has not always been the case. Between 1870 and 1884, nine states repudiated their debts. Municipalities have done much worse; Duluth, Keokuk, Lawrence, Topeka, Little Rock, Memphis, New Orleans and Houston are among those which have flagrantly defaulted.

This has led to a general subdivision of municipal bonds, "legal" and "general market bonds." By "legals" is meant bonds issued by a municipality which conform to the strict requirements of the Eastern states regarding legal investments of savings banks and trust funds. By "general market" bonds, the security is taken for granted—a very dangerous thing to do, as many buyers have learned to their sorrow.

42. *Matters Considered When a Security Issue is Contemplated.*—In formulating a plan for raising new money, the management of a corporation has several things to consider. Sufficient money must be secured, the cost of securing it must be reasonable, and the character of the security which will be most easily and advantageously disposed of, must be thoroughly considered.

Investors will pay more for some issues than others. They will offer more for a senior than a junior issue, even if both have practically equal and ample security. When an investor buys a bond, his greatest aim is protection, and that condition is best satisfied by a first mortgage bond.

CHAPTER V. The Mortgage Back of the Bond.

43. *Types of First Mortgage Bonds.*—There are two general types of first mortgage security:

First, those which specify that all future property which may be acquired, shall come under the terms of the mortgage.

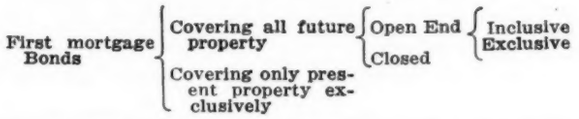
Second, those which specify property and do not have any interest whatever in that which may subsequently be acquired. This plan does not contemplate any sudden necessity of extension, which happens so frequently in growing communities.

44. *Classification of First Mortgage Bonds.*—Under the first class—those which specify all future property shall be under the mortgage—there come two divisions: The open-end mortgage and the closed mortgage.

45. *Open-End and Closed Mortgages.*—Under an open-end mortgage, bonds may be issued to raise any amount of money, it being specified, however, that all proceeds of the bond sales shall be devoted to the property.

With the closed mortgage, bonds are limited as to the amount of issue. In turn, the closed mortgage has two divisions: Inclusive, or where property subsequently acquired shall be included in the lien on the property; and exclusively where the lien is limited to the property described in the bond.

The following table clearly shows these relations:



46. *The Stipulations of the Mortgages.*—The ordinary mortgage conveys "all right, title, and interest" in a given piece of property to a mortgagee, with the agreement that the transfer shall become void when principal and interest are paid as promised.

A corporation mortgage is a larger one and necessarily more complicated because a separate mortgage cannot be given with each bond. Unlike the house and farm mortgage held by one individual, the bonds of a corporation, in various denominations of convenient size, are held by many individuals.

47. *The Deed of Trust and Its Provisions.*—It, therefore, becomes necessary when a number of bonds are issued against a mortgage, to give the mortgage to some individual or concern, to act as trustee for the bondholders. In such instances, the mortgage indentures become a deed of trust.

The deed of trust is an instrument in writing in which the rights and obligations of all parties—the corporation, bondholder and trustee—are set forth in such manner as to preclude any misunderstanding. The property must be explicitly described so that no conflict with other mortgages or evidences of debt will turn up. The date and names, followed by legal status of the corporation, the state which gave it birth, and the amount of stocks and bonds and kind of property owned are included in the first part of the deed. The authority given by directors and stockholders for the bond issues is set forth and is followed by a statement of what the proceeds are to be used for. A detailed description of the property, the duties of the trustee, the agreement as to payment of principal and interest, and the obligation to pay taxes and assessments are all part of the provisions to keep the property insured and protected and the lien valid.

There is necessarily an understanding that specifies control until default, what default means, and how much time shall elapse before the bondholders shall act in case of default of interest or principal. There is also predicated the percentage of bondholders necessary to request a foreclosure and instructions given to the trustee as to his course of action in case of a receivership. The duties, responsibilities, liabilities and compensation of the trustee are stated, and provisions made for the appointment of a successor should such an event be necessary. Finally, the signatures and seals of the corporation and trustee, through their officers, follow with attestation of seals.

(To be Continued.)

British Comment on U. S. Telephone Developments.

All the engineering journals of Great Britain in their reviews of progress during the past year regret that the war stopped developments in telephony in Europe, handicapped the forward march of wireless telephony, and left to the United States the work of carrying onward to a triumphant finish telephonic achievements of great significance. Special mention is made of the transcontinental telephone triumph of the New World.

Practical Subjects—Letters and Discussions

A Novel Publicity Stunt in Johnstown, Pa.

A novel advertising display made by the Johnstown Telephone Co., of Johnstown, Pa., at an industrial show held at the Auditorium in that city, during the week of February 14, and which was attended by more than 50,000 people, attracted the attention of every visitor. The accompanying reproduction of a photograph of the display does not do justice to its attractiveness and the ideas involved, as it was most spectacular.

The center point, or large circle, on the map represents Johnstown, and the black lines radiating therefrom to the different large cities, indicated the long distance connections the company wished to bring before the public. In the center of each black line was stapled a No. 20 gauge copper wire which was not visible to the naked eye at a distance of five feet. This wire was broken up into several sections, leaving a spark gap in each section of not less than a quarter of an inch, the number of spark gaps depending entirely upon the length of the line. As the spark coil used developed a five-inch spark, it will readily be seen that it was not possible to get more spark gaps in each line than the output of the coil box.

At each city shown on the map, there was installed a 15-watt tungsten lamp, operated from a 110-volt lighting circuit. These lamps were of different colors which, of course, made them more attractive and pleasing to the eye than plain white globes.

An interrupter was made up entirely of wood, the wheels being 30 inches in diameter and placed six inches apart on a shaft. Upon the framework were installed the necessary segments connected to each individual line and each individual lamp, and over which the brushes mounted on the wheels, would pass. The interrupter was motor-driven, and was geared down to one complete revolution per minute over the entire group of 18 segments. A brush in passing over a segment, would throw a continuous flash over the line connected, so long as the brush remained on the segment. After the flash was over, the 15-watt lamp at the end of the line would light and remain illuminated until the flash started again on another line.

Advertising Display of Johnstown Telephone Co. at Recent Industrial Show in Johnstown, Pa., Which Startled Every Visitor.

As previously stated, the interrupter made one complete revolution every minute, which means that each of the 18 cities were flashed individually and separately within the 60-second period. The flash on each of these circuits was so intense that the noise incident to the spark could be heard for a distance of 200 feet.

Another feature of the exhibit was the installation of a set of telephone bells of one octave, tuned up to the scale of C to C, on which were played pieces and parts of popular airs of the day by one of the telephone operators. The big feature incident to this stunt was the fact that the keyboard was installed and operated from the main exchange building over

a cable run to the Auditorium, a half a square away. This was made possible by placing a transmitter in the exhibit in a circuit with a head receiver of the operator at the keyboard in the exchange building. She was thus enabled to hear her own music as heard by the people in the Auditorium.

As all the apparatus, except the bells, was located back of the map, and no one near at hand at the exhibit, the continuous operation just described, was, and still continues to be, a deep mystery as to how the "blamed" thing was done.

Advertising literature was distributed, and in the opinion of the Johnstown officials, the display was the master stroke of all the many and varied publicity stunts which the company has originated from time to time.

The two "Toms"—namely, "Tom" Carliss, superintendent, and "Tom" Kirby, chief switchboard man—of the Johnstown Telephone Co., do not have the devices patented. They will be pleased, however, to hear from any who may use the scheme, as to its worth as an advertising feature.

"Telephony's" Home Course for Telephone Men.

(Not meant for Study.)

By Well Clay.

	1	2	3	4	5	6	7	8	9				
	0	0	0	0	0	0	0	0	0	0	0	0	
	0	0	0	0	0	0	0	0	0	0	0	0	

No runs, no hits, many errors.

THE WAY WE REFORM.

I'm a goin' t' swear off from my sinful ways
An' travel the straight path th' rest o' my days;
I'll cut out th' things that are harmful t' me
An' be th' kind o' a guy that I ought t' be—
After one more time.

I'm a' goin' t' stay at home every night
An' do only the things I know t' be right;
To speak only kind words and wear a bright smile;
I'll not spend my money but save up a pile—
After one more whirl.

It's time I quit foolin' I plainly can see.
You don't think I'll do it, but leave it to me.
I'll cut out th' habits that lead me astray
An' be a real model, 'cause that's th' best way—
After one more splurge.

Do you see any truth in the above lines? You do, and you know it, because, if you are old enough to run a telephone business, you have been there yourself, the same as I.

And how true it turned out to be, when I had looked over the situation, after my encounter with Mr. Depreciation. I could clearly see the way in which it was my duty to go, but naturally hesitated about precipitating the reform into a situation which seemed all serene on the surface. Then, too, I surely *did* hate to tell those directors about what *had* to be done; not because I was in any way to be blamed for a perfectly natural condition of affairs, the status of the business in general considered, but one naturally hates to admit that he has been wrong after he has often confidently assured people that the business was on a *sound* basis.

Therefore, I qualified with Common Sense and agreed to put the matter off until the beginning of another year on the condition, imposed by that insistent butinsky, that I would get to help me another one of his seemingly innumerable friends, a crusty old tightwad known as Mr. Strict Economy; whom he assured me was the *next best* thing to having *More Revenue* on the job. But, in order that that Mr. Strict Economy might be of the greatest assistance to me, Mr. Common Sense insisted that I must at least have the girl, Good Bookkeeping, to help him.

Strict Economy was very old, quite testy in his temper, and got very little help outside, as he was not a popular fellow like Dollar a Month and Free Service, but rather preferred not to mingle with the ordinary run of folks. His special delight was to sit around, as I soon learned, and find fault about *expenses*. He near drove me crazy.

Mr. Common Sense told me that, if I would let the old man and the girl run the job for the rest of the year and keep the other boys, Dollar a Month and Free Service, pretty much in the background, I might get along for awhile. But he was sure that it would be only a matter of time until I would have to make the change entire as he had advised.

Well, I tried to follow out that plan, but it was hard because I got to dislike old man Economy. He bore down too hard and vetoed a good many of my plans which I am sure were for the best interests of the community. You couldn't convince him of anything either, he was that obstinate. But he would argue with you all day about ten cents, or until you finally gave up in disgust and let him have his way.

His motto was *never* to *spend* what you *didn't have*. He would always say, in answer to inquiries about branching out a little here and there: "You know we have only *just enough* money to pay *running expenses*. How can we bore an *auger hole* with a *gimlet?*" The most exasperating thing about this old guy was that he was most always right and *didn't* employ any bushel basket to shield the fact from the public gaze—probably on the grounds of consistency.

Then another thing: Those happy-go-lucky boys, Dollar a Month and Free Service, were so popular that, when I kept them at home working around the warehouse and such places for the purpose of curtailing their activities, they were constantly being inquired after by their friends and sought by others desiring to make their acquaintance until they became ten times more pestiferous than when they were on the job. Everybody wanted them in their home circles, and no hints that we must disappoint them went with the people who were courting their society.

When I referred them to my new friend Economy, they openly sneered at him and said they were not interested in such fellows; said that old friends were best and that Old Dollar a Month and Free Service would take care of their friends. I told them they might take care of their friends all right but in that case their friends were not the men who were holding the stock, but were the farmers using the service.

It was considered a good joke but no one of those to whom I talked in that strain ever thought it meant that their old Friend Dollar a Month and Free Service would be replaced.

Well, we got along the best we could on the basis we had been on from the first, with the exception of the two new ones recently added. That new girl, Good Bookkeeping, was nearly the death of us because the better she kept her books, the slimmer our chances seemed to show up for evading the deteriorating influences of Old Man Depreciation, who seemed to be always hanging around in spite of the cool reception he was getting. Not one of the board of directors even knew him by sight and only one or two had even heard of him. I knew he was there, though I hadn't realized then the extent of his activities.

We were swamped with orders for telephones and it looked as though we had a good thing—to outsiders. I could sell stock, had I wished, with the greatest ease and no questions asked. We had many offers of money from people who wished to get in on the ground floor, and some of the directors were a little puzzled, I think, at the stand I was taking in not selling any stock or recommending such a course. It is hard not to pose as a hero of finance when one has the chance, but Common Sense advised not. He always asked embarrassing questions like what would I do when the investors got next, and so on.

Finally when the stockholders asked, at the annual meeting why I was not keeping up with the new orders for installations but were letting them get months behind, I held a consultation with Common Sense and then let the cat out of the bag. Told them the exact truth, so far as I knew it.

Did they seem impressed? Not a particle. They appointed a committee to go over the books and the idea being that, if the books were correct, all there was to do would be to raise the rates to a point that would insure reasonable returns, and so notify the patrons. There was to be no trouble about it—absolutely none. The patrons had good sense, were good fellows and liked the service; in fact couldn't get along without it.

The calmness with which they took the situation was very agreeable, and so was the situation until—well, there's another week coming so wait until then and I'll tell you something that will sure interest you fellows who are going to raise your rates for the first time.

QUIZ QUESTIONS FOR REFLECTION.

What is the difference in earning power between Hot Air and Free Service?

What is the use of fooling yourself unless it pays? And it never does.

How far will a friendly feeling for the company stand for the encroachment of an increased price in service?

What is the use, anyhow, of trying to give something for nothing when the poor house is so crowded?

Which accumulates the most dust—the man who leads the procession or the one who follows the crowd?

(Don't get lost on the way.)

Action of a Diaphragm.

By E. W. Kellogg.

In all telephones except the speaking tube, the air vibrations produced by the speaker must be communicated to some piece of solid material. This is best done by using a light elastic diaphragm, turned so that the waves strike it directly. The diaphragm is pressed back while the pressure against it is high, and springs forward when the air pressure against it is low. Obeying the law of elastic bodies, that the deformation is proportional to the pressure applied, it executes vibrations similar to those produced in the air.

Even under the best conditions, however, the transfer of sound waves from air to a solid body is very inefficient. The solid is so much heavier than air, and its movements so slight compared with those of the air particles, that the air waves are reflected from the diaphragm almost undiminished in amplitude, having given up only a small part of their energy to the diaphragm.

A diaphragm turned parallel to the direction of the sound waves will experience the variations in pressure, and be set into vibration, provided one side is shielded by inclosing it so that the pressure on one side is not balanced by an equal pressure on the other side. If, however, the diaphragm is turned so that the waves strike directly instead of simply passing over it, the variations in pressure against the surface will be doubled, for, in addition to the normal differences in pressure resulting from the passage of the wave, the moving air particles are thrown against the surface, creating what may be thought of as an added "wind pressure." The reflection of a wave from a stationary surface causes a doubling of the pressure at the point of reflection.

When a vibrating diaphragm is giving off sound waves, it finds difficulty in imparting its energy to the air because the air is so light that it is incapable of strongly resisting the movements of the heavier solid. There is not a direct throwing away of energy at this point, as was the case when the diaphragm was receiving the vibrations from the air and reflected the waves. But, were it possible to abstract more useful power from the moving diaphragm, the latter would in turn draw more power from its source of supply, and the efficiency of the telephone as a whole—transmitter, line and receiver—be improved.

A telephone receiver is an electric motor, and it is very much underloaded, with a consequent inefficiency not only in the motor, but also in the generator and the transmission line over which the motor is supplied with electric power. Unfortunately, however, it is very difficult to increase the load on this motor, for it must inevitably work in a medium of air. In the matter of design, accuracy in the reproduction of the sound and convenient size and weight outweigh, in importance, the loudness of the sounds produced.

Test Set for Farmer Lines.

The test set circuit submitted by Edward Ferris in TELEPHONY of February 12, is similar to one that I have been using for several years. However, a transmitter mounted on

Test Set in Use.

the test box never appealed to me. I use a microphone with the battery cut-out mounted on the handle. I also have a "short" key mounted on the top of the set.

With this apparatus it is almost a pleasure to test with—

Nebraska,
Covered with snow;
Howling blizzard—
Thirty below.

I am enclosing a picture of this set in use. You can see that it gives satisfaction.

York, Neb. Rufus Comstock.

Qualifications of a Good Employe.

Sincerity,
Energy,
Regularity,
Vim and vigor,
Interest,
Courtesy,
Efficiency.
Faithfulness,
Industry,
Reliance,
System,
Trustworthiness
make a good employe.

Cleveland, Ohio. Jay W. Hache.

Chicago Telephone Co. Pays Tax to City.

A check for $246,475.79, representing 3 per cent. of the business done by the Chicago Telephone Co. for the six months ended December 31, 1915, was recently paid over to the city of Chicago by the telephone company. This represents the largest business ever done by the telephone company. The payment is made as compensation for the use of the city streets in accordance with the company franchise.

The payment for the same period in the preceding year was $225,187.92, and for the six months ending June 30, 1915, was $236,630.24.

State Commission Regulation of Telephone Companies

Discussion of Commission Regulation as Applied to Telephone Service—Abstract of Address Made Before Meeting of Springfield, Mass., Chapter of the New England Telephone Society, by Chief of Telephone and Telegraph Department of Massachusetts Commission

By Wm. H. O'Brien

I was very glad to accept your invitation, not only for the personal pleasure of meeting you, but because I felt that some good might result from a conference between one who could speak for the regulating body of this state and those who are responsible for the most vital thing that enters into the prosecution of every form of business and the social relations as well, viz., telephone service. You can theorize until the cows come home about the importance of railway transportation, steam or trolley, railroad or telephone rates, but the real vital thing is the furnishing of a reasonable standard of telephone service at all times, and without which there can be no material progress, industrially or socially.

I am from the ranks and can hardly be expected to advance a lot of 'hifalutin' theories about what you ought to think about your work; how you ought to do it, and what the people ought to think about their responsibilities, etc. We have had a surfeit of that sort of "bunk" which never proves anything except an excuse for some highbrow theory-specialist to pull a fat salary. So let's get down to brass tacks.

You represent a great public utility, the value of which to the community and to the investor is measured entirely by your interpretation of the technical and common-sense problems that present themselves to you daily for solution. Unfortunately for the investor and the public, it is only within a few years that your real importance has been recognized, and how far you have been responsible for that condition is an open question.

Massachusetts, in common with many of the states, is supervising the work of the telephone and telegraph companies as well as that of the railroads, steam and trolley, and express companies, and you have asked me to present the viewpoint of the commission in connection with this work. Let us inquire for a moment into the reasons for the presence of such regulating bodies.

Reasons for Presence of Regulating Bodies.

It was in 1831, only a year before Prof. Morse drew the picture of his wonderful electromagnetic device, that the first steam locomotive was placed upon the rails between Albany and Schenectady. And while the operation of the telegraph was conducted for a brief period by the government, railroad and telephone and telegraph services have continued under private management up to the present time.

In order to enable private capital to conduct these enterprises, it was necessary to secure franchises from the national government and from the various states as well, and rights of way from local authorities, city and town. So to this extent, the people became partners in these enterprises, and as such were entitled to a share of the benefits that resulted from the operation of these concerns, in the shape of reasonable rates based on costs, and efficient service at all times.

There came a time when it became evident that the partnership of the people was not being seriously considered in the division of good things, and protests began to be heard from various sections of the country. Movements were started for the creation of regulating bodies—timid statutes at first, but from time to time this authority was increased until today the public service laws of our state confer almost court powers upon the commission. This body is charged with the duty of securing to the public fair rates and reasonable service without discrimination and at the same time to insure a square deal for the corporations against unreasonable demands which are sometimes made upon them because of wrong conclusions based upon inaccurate information.

We have heard many theories as to just what this form of public regulation was expected to accomplish, but I think the one I am now going to quote is about the best homeopathic dissertation on the subject that has ever been uttered, and it was the judgment of a most prominent man of exceptional experience and business success. His words were as follows:

> The people are experimenting with the theory of assisting private property to serve public need. Profit must be a mere by-product of service. In other words, the further advancement of progress demands that utilities render the highest grade of service at reasonable rates. At the same time they must promote common sense and good will as by-products and earn enough profit to expand and improve in business. American business men are thinking in terms of the common good in a greater degree than ever before. This is not because they are morally better than their forefathers, but because the progress of the world demands it.

We might well stop right here with a fervent "Amen" to that thought, but you want a few words from your commission as to the situation in our state and what it has been doing and how its efforts have been met by the company that you, in your various capacities, represent.

In connection with that, let me read the following extract from the first report of the committee on telephone and telegraph rates and service, appointed by the National Association of Railway & Public Service Commissioners, one of whom was a member of the Massachusetts commission, as indicating the trend of mind of the men selected by the various states to take up this important work.

> There are comparatively few precedents to guide the various commissions in the regulation of rates and service of these public service corporations. Conditions so vary that no uniform schedule of telephone rates seems to be in effect throughout the country, except in certain localities where some of the commissions with jurisdiction have fixed maximum rates for a certain class of service. Nor have many of the commissions adopted general rules for the regulation of telephone and telegraph companies, most of the commissions having contented themselves with trying and deciding each case upon its merits as it came before the board.
>
> The duty of every corporation is to render to the public efficient service and to collect a reasonable charge for such service. In determining a just and reasonable rate for the service rendered, the commission should take into consideration the efficiency of the service as well as the amount of capital devoted to the public use. There are many elements entering into a reasonable rate. The public is willing to pay a reasonable price for efficient service, but it is neither willing, nor should it be required, to pay an unreasonable rate for a poor service. And, on the other hand, the corporation which furnishes efficient service should be allowed to charge and collect reasonable rates for such service, else there is little to stimulate better facilities.

While admitting the necessity for regulation because of the failure of many utilities to recognize the rights of the public, you cannot repair with an axe, and we are not going to get very far on constructive lines by continuing post-mortems. The one who is charged with the responsibility of this important work and does not first of all appreciate the fact that he must look ahead and not behind, will not remain any longer on the job than the official of the corporation who has not yet awakened to the fact that if he is to get the best results for

his investors he must be both anxious and willing to meet the public at least half way, with the very minimum of technicality and red tape.

My experience of a good many years in public relations work has confirmed my natural belief that 97 per cent. of the public are absolutely fair and reasonable if they are told the truth concerning the many perplexing things that arise in connection with the operation of public utilities, particularly the telephone —and without any attempt to cloud the matter with a technical mélange that in almost every case leaves the complaining individual in a very suspicious frame of mind, and rightly so.

Whatever opinion you may have formed of the public service commission and its work, I want at this time to disabuse your minds of one idea, at least, which seems to find considerable favor in certain quarters. That is that the commission is looking for trouble (other than circuit or operating) and is imposing a burden upon officials and the employes. Intelligent and fair-minded supervision which is met with a like spirit on the part of the responsible officials of the companies concerned, is the greatest possible protection to the employes and cannot fail to benefit the company as well as the public.

So far as your company (the New England Telephone & Telegraph Co.) is concerned, the presence of our commission, with the supervising power in the shape of a telephone and telegraph department, doesn't mean that anybody is going to get hurt unless he tries to start something and refuses to listen to reason. And there you have it—reason. That's the policy of the commission. Let's sit down and reason this thing together, with due allowance at all times for the shortcomings of human nature.

Co-operation of Telephone Company.

Just so long as the proper operation of telephone service depends upon the human element, whether it be in front of the switchboard or in the line or clerical forces, there will be mistakes. But it is only the company that doesn't profit by them that needs our attention. In this connection, as far as your company is concerned, I want to give credit to the responsible official, Vice-president Hall, with whom we have to deal in connection with our work. As a rule, we have had the fullest co-operation and there have been but two or three cases where the matter was not settled by the department and went before the commission. The last thing in the world we ought to think of would be to tell your company how to run its business, but we have tried to assist in bringing about some changes in the various practices which are admitted to be of benefit to both the subscribers and the company. (These improvements have been fully reviewed in Telephony.)

No intelligent telephone representative will argue for the correctness of present recording methods, but that is no reflection on the honesty of the company, as it has the best devices that has been brought out up to date. Surely no sane person will suggest that an operator would record a call against a subscriber which should not be so recorded. But there are many combinations whereby during the "load period" (and you can rest assured that in the metropolitan centers the operator has mighty little leisure) she might now and then fail to record one that should be charged.

And right here let me say as a result of extended observation, that, taken as a whole, I believe the operators in the service of the New England company in the larger exchanges of this state where the real test comes, to be superior to any similar body of workers in the United States in intelligence, ability and conscientious effort.

In this connection, I have in mind the policy which exists in all large industrial organizations, under which large numbers of skilled workers are released during temporary business depression and reinstated when business resumes. If there is one service more than any other which is vitally affected by such a policy, it is the telephone business. And we hope it will never become popular with your company.

While admitting the necessity of maintaining a system of "efficiency" which has as its object a low percentage of operating costs, the greatest care should be exercised in avoiding the danger line. It is a much more difficult proposition to restore normal conditions after you have run by the danger signal than it is to reach it, because in addition to the impairment of reasonable traffic and plant standards you have added the fearful debit of a just resentment on the part of the public, which is not easily wiped out in the necessary effort to get back to safe ground.

You cannot have a reasonable standard of service unless the operator and the lineman are free from anxiety as to the tenure of their employment. And in just the proportion that this anxiety on the part of the employes referred to is lessened, will the quality of service rendered be measured. A regulating body cannot honestly say to the public or to the legislature that the quality of service furnished is reasonable unless it knows the conditions under which the service is produced, and what ought to be the standard under varying conditions.

In conclusion, let me urge co-operation between the field forces and the supervising officials of your company, in order that the best results may be obtained for the public who are so dependent upon telephone service every minute of the day's active period. So far as the commission is concerned, we will endeavor to co-operate in every way with your officials, who have up to the present time shown every disposition to recognize their responsibility to the public, through the commission. With this policy continued, there can be no question of the success of public regulation, which will mean a greater security for the investor because of the good will of the public toward the company, the greatest asset that any public service corporation can have and without which, no permanent success is possible.

We are attempting to work out the various problems that come to us, in a spirit of fairness to all, realizing that in almost every question there are two sides. In this connection we are trying to establish a tribunal where these many problems can be worked without prejudice to the viewpoint of either side in the hope of establishing proper relationship between the companies and the public with common sense and good will as the basis of their understandings.

Construction Plans of Kansas City Home for 1916.

The Kansas City (Mo.) Home Telephone Co. is well started upon a year of expansion that promises to greatly exceed the year 1915. It is continuing to increase its underground system, and immediate prospects are for the expenditure of at least $25,000 in the next two months, to care for business growth in additions. The most important growth of Kansas City now is in the southeast part of the city, and in this rapidly growing district, the Home company's installations are increasing very rapidly.

An important feature of the expansion this year is in private branch exchange service to apartments and hotels.

Telephone Merger in Village of Sanborn, N. Y.

The New York Telephone Co. sold out its interests in Sanborn, N. Y., to the Sanborn Home Telephone Co., of Sanborn, which is controlled by residents of that village. About 200 subscribers are turned over and the exchange consolidated. The New York company, however, maintains toll connections with the village under the terms of the sale.

Improvements to Live Oak, Fla., Telephone System.

The Florida Telephone Co. is making extensive improvements to its system in Live Oak, Fla., including the changing of its lines from grounded circuit to metallic and the placing of wires and cable in the fire limits of the city underground. It is estimated that the improvements will cost in the neighborhood of $11,500.

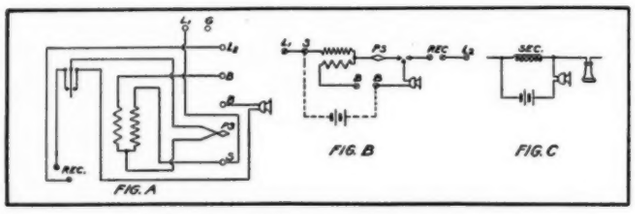
Queries on Theory and Practice

Why Telephone Talked When Improperly Connected.

Enclosed find diagram of W. E. set 305-G (Figs. *A* and *C*). On several installations the batteries were connected to the lower post *B* and post *S*, instead of to the two posts *B*. The transmission was fair. Why did it talk at all?

The telephone talked because the secondary of the induction coil acted as an impedance coil with its primary winding open. The net result is shown in Fig. *C*.

Though part of the battery current will flow out through the receiver to the line, the bulk of it will flow through the



Diagrams of Connections of Set.

secondary and transmitter. When the transmitter rises and falls in resistance, the voltage at the terminals of the secondary will fall and rise also. This fluctuating voltage will drive an alternating current through the receiver and line, transmitting the conversation.

The single winding of the secondary acts like a transformer or induction coil having a one-to-one ratio, whereas if connected in the usual way, there would be a step-up action.

Line Resistance, Cable Connections and Shutter Restorer.

I have a voltmeter to find the resistance of lines, using sufficient battery to make the scale show 15 volts on a short circuit. By experimenting with coils of known resistance, I have found that when the meter shows 8.1 volts, then resistance in the circuit is about 1,000 ohms; 6 volts, 1,800 ohms, etc. I would like to know how to figure out the resistance from the voltage by simple arithmetic.

Our lines are ground return and metallic through the cables. I have always been taught that there would be no cross talk in the cable if this method were used, but it does not seem to work out in our case and I cannot understand why it should. It seems to me that after the operator has quit ringing, made the connection and cut out, the ground side of the cable pairs is entirely out of the circuit, as indicated in the diagram, Fig. 1. Am I right or wrong?.

We have 230 farm telephones, coming in on 20 lines. Of course, the shutters fall whenever a farmer rings his neighbor, and the operators must be constantly restoring shutters. Sometimes half a dozen will fall in two or three seconds. I have made an attachment by which the slightest

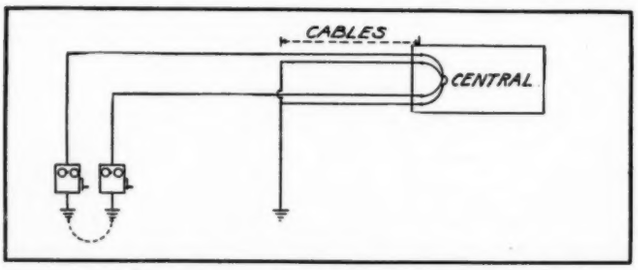


Fig. 1. Ground Return Circuits Metallic Through Cable.

touch on a button located near the edge of the key-shelf instantly restores every shutter that is down. It is made from old junk and therefore costs nothing as far as materials are concerned. It is shown in Fig. 2.

The lifting wires are of No. 12 steel wire filed down to pivots at the ends. The hinge pins of the end shutters are moved inward a fraction of an inch to make room for the pivots. The button has a very sensitive adjustment. A touch makes every shutter go up like the proverbial cat shot in the back with a bootjack.

Your method of finding resistance of lines is a very simple, direct one and is satisfactory within limits. If you had a rheostat or resistance box giving resistance in one ohm steps up to 10,000 ohms, you could get the resistance without any calculations. Simply get the reading on the line in the usual way. Replace the line with this rheostat or resistance box and turn its dials or move its plugs until you get the same reading that you got on the line. Then you can read the value directly on the resistance box.

It is usually much cheaper, however, to figure the resistance out and it is very simple.

First. Divide the battery voltage by the reading observed on the line.

Second. Subtract "one" from the quotient.

Third. Multiply this by the resistance of the voltmeter.

Example: Your voltmeter seems to have a resistance of about 1,190 ohms. Assume a battery having 15 volts and that the deflection with the line in series is 4.5 volts.

(1) 15 divided by 4.5 is 3.33.

(2) 3.33 less one is 2.33.

(3) 2.33 multiplied by 1,190 is 2,773 ohms, the resistance of the line.

Note.—The foregoing in algebraic form, is

$$x = R(E/e - 1)$$

in which E is the battery voltage; e, the reading on line; R, is the voltmeter resistance; and x, the resistance of line.

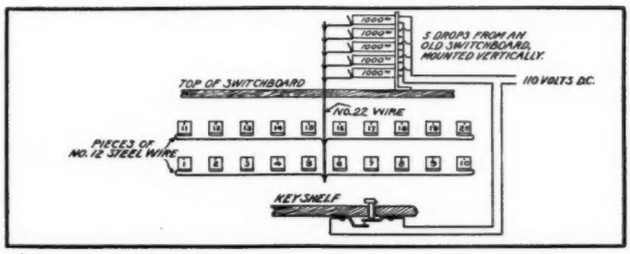


Fig. 2. Device for Automatically Restoring Drop Shutters.

You are right as to the conditions existing when two grounded lines are connected through the switchboard. The chief advantage to be gained from connecting lines through cable pairs in the way described (Fig. 1) is that it avoids having two lines in the same pair, and thereby reduces the cross talk quite materially. The two wires of a pair always have the worst cross talk between each other and this worst form is avoided if only one line occupies each pair.

There still remains cross talk between the line and other pairs. Grounding one or both ends of the mate wire (or return) of each pair, reduces the cross talk somewhat, by increasing the capacitance of the line to earth and making it easier for current to flow through it to earth than to adjoining wires. Some cross talk will still remain.

Your device is very good and if properly made will save a great deal of the operator's labor and time. Of course, the operator must take care to answer a call intended for her before restoring shutters which have fallen because of people ringing each other, or the act of the restoring device will obliterate the call.

New Exchange Building Planned for Nashville, Tenn.

The directors of the Cumberland Telephone & Telegraph Co. have decided to erect a new building in Nashville, Tenn., to take the place of the structure burned recently.

Duties of Plant Superintendent of a Telephone Company

The Modern Tendency Toward Specialization—Organization of a Telephone Company and the Handling of the Various Departments—A Paper Presented at First Convention of United States Independent Telephone Association

By L. E. Hurtz

The tendency of modern business is toward specialization. Men are trained to do certain classes of work on the theory that they can be more useful by doing one class of work well than attempting to do many and consequently mastering none. With the disappearance of the little workshop and the development of the large factory, specialization in work has progressed until today almost everything that is produced economically is handled by specialists in its design, manufacture and sale.

In the olden days of the small shop, specialization in its present sense was impossible, but today a factory employing a number of persons can ordinarily turn out its products at less cost by organizing groups of specialists in the various parts of the plant. No modern factory would attempt to produce a line of goods without installing machinery, specializing its work and introducing a comprehensive system of shop costs in order that the principles of scientific management may be followed.

Until a few years ago the operation of telephone plants was not specialized to any great extent. In small plants one person did all the work; in larger plants one person supervised all the work; and in large systems one person supervised all the local managers, who in turn supervised all the work of operating the plant.

The nature of the telephone business is such that even rather small plants, operated under the supervision of one person, specialize or functionalize the work to a certain extent. The operation of the switchboard is ordinarily handled by a different person or persons than those repairing the lines, while the commercial work is ordinarily performed as an incident to the duties of some of the employes.

In the larger exchanges where a considerable number of persons are employed the work is naturally specialized, for where there is sufficient work of any class to keep one or more employes busy, certain of them are ordinarily delegated to do it. Thus in the larger companies the operators' labors are usually confined to operating the switchboard; a foreman or wire chief has charge of the plant work, and a commercial manager, cashier or bookkeeper handles the commercial work. The traffic work is usually in charge of a chief operator who has been employed by the company for some time, but often has not received very thorough training. All the above departments were formerly supervised by the superintendent, general manager or president, or owner of the company.

Within the last ten years many telephone companies—and particularly the large ones—have been reorganized much along the lines of the operating department of the great railroads. A modern system of organization of a telephone company is as follows:

Modern System of Organization of a Telephone Company.

The stockholders are represented by the directors who ordinarily elect a president, who is responsible, through the directors, to the stockholders for the conduct of the company. The president is ordinarily assisted by one or more vice-presidents in charge of parts of the work, a general manager in charge of the operation of the company, a treasurer in charge of the details of the company's finances and an auditor in charge of the accounting department. These officers ordinarily report direct to the president. Each of these department heads have such forces as their work requires and will not be discussed at any length, except in the department we are interested in discussing today.

Handling the Operating Department.

The operating department, in charge of the general manager, may be handled by either of two general methods:

First. Local, district and other officers, supervising the work in each geographical area and reporting to the general manager.

Second. The modern method of dividing all the work to be handled by the operating department according to its functions and having such function supervised by a specialist.

Each method of organization has its advantages. In a large company the functional organization is much superior to the geographical, for the reason that if a large number of people are engaged in each department, they can work more efficiently if divided into groups of specialists and are supervised by specialists than when all do general work and are in charge of men who supervise several kinds of work.

In the functional organization the operating department ordinarily consists of the commercial, plant and traffic departments, each in charge of a superintendent, who ordinarily has an assistant in each division. Each division superintendent ordinarily has district supervisors directly in charge of the local manager, foreman or chief operator, who in turn is in charge of the local operating forces. Each supervisor should be a specialist in his particular part of the work.

Operators Are in Closest Contact with Public.

It is probable that the public comes in contact most with the operators and, if given reasonably good service, would not know that the company had any other employes except for the monthly call of the collector. If the service is not good, the public sees the troubleman and if they desire a change in service or make a complaint to the office, they come in contact with the commercial department. Thus the operators are probably in closest touch with the public, while the employes of the commercial department act as the mouthpieces of the company and represent it in most matters.

The plant department is not so well known to the public on account of the nature of its work. In many organizations the plant department is not given the attention it deserves and often it is in charge of a poorer grade of men than the other departments. Its importance, however, entitles it to just the opposite treatment. It is the plant department that expends the largest part of the company's income. Often thousands of dollars will be spent by the plant department with less supervision than hundreds will be spent by other departments.

Of recent years the necessity for high grade plant supervision has been realized and today we find the plant department in most of our companies in charge of highly trained and experienced men, whereas they formerly were in charge of experienced men who often lacked training.

Modern plant work is handled under carefully drawn detailed specifications which have tended to standardize construction and maintenance work so that an employe trained in one exchange can go to another and work efficiently without having to learn local conditions. Better work at less cost is the result of the standardization of construction and maintenance work. These benefits have resulted from the higher plane upon which the plant work has been put by high grade plant supervision which includes engineering of the highest order.

As an example of a modern organization is shown the accompanying chart of the Lincoln (Neb.) Telephone & Telegraph Co., operating 88 exchanges. I consider this organization a very efficient one for a company of this size.

A larger company could use this same plan of organization up to a point where the extent of territory covered would require further operating divisions. In such a case the superintendents would be called general superintendents and under them would be division superintendents, each having an organization of about the same character as shown for the superintendent on this diagram.

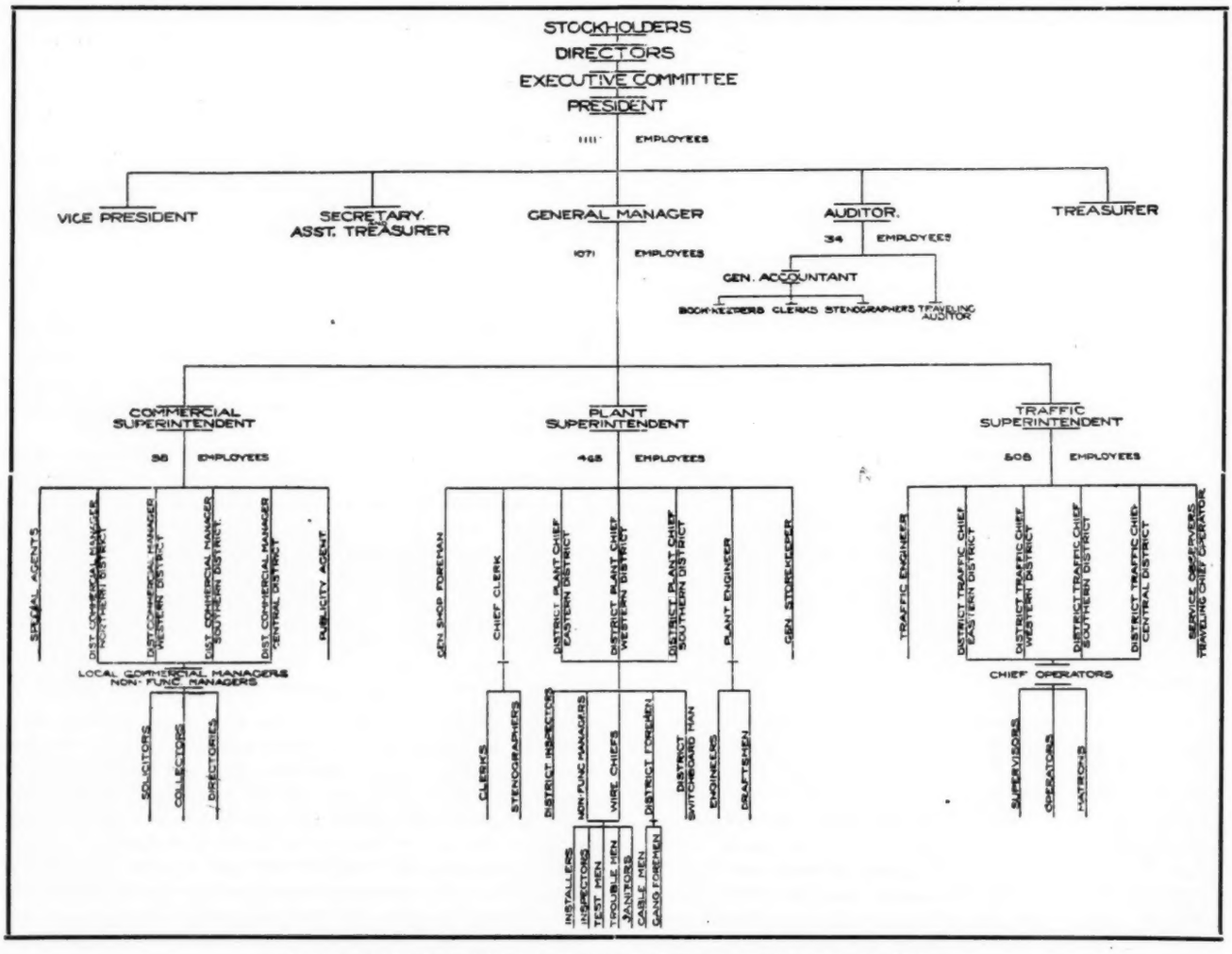
Smaller companies operating a number of exchanges could use this same form of organization by reducing the number of districts and by otherwise reducing the size without changing the form of the organization.

This paper was intended to cover the plant superintendent in particular. In order that the discussion may be along concrete lines I will outline the duties of the plant department, under the supervision of the plant superintendent of the Lincoln company. While this organization may not be ideal, we think it is efficient.

The plant superintendent supervises all the operations of the plant department and has charge of the construction and maintenance of all the physical property of the company and the operation of the automatic equipment. Reporting to the plant superintendent are district plant chiefs, each one in charge of a portion of the plant, averaging about 30 exchanges each. I will return to the duties of the district plant chiefs.

The general storekeeper and the general shop foreman report directly to the plant superintendent. These departments furnish supplies and make shop repairs for all districts. The chief clerk and his force handle the office routine in the general plant office. The plant engineer reports to the plant superintendent. He has charge of the engineering department, handles all engineering work for the company, except equipment engineering, which, in our organization, is handled by the traffic department.

The district plant chiefs have charge of all the physical property of the company in their respective districts. Reporting to them are wire chiefs, non-functional managers, construction foremen, district inspectors and traveling district switchboard men. The duties of each of these men can be judged from their titles. Wire chiefs have charge of the physical property in exchanges where commercial managers are employed, non-functional managers have charge of physical property and commercial matters in offices where a commercial manager is not employed.



Organization Chart of Lincoln Telephone & Telegraph Co., Lincoln, Neb.

These men have charge of all installers, inspectors, test men, troublemen and janitors but ordinarily handle no heavy construction work, this class of work being handled by the district construction foreman.

During the past year we have distributed a monthly magazine among the employes. In this magazine we try to report all items of personal interest to the employes, also comparative tables of the records being made by various exchanges. We find that this magazine has been much appreciated and created a lively interest in the company's affairs, which has fully justified its cost.

Is Telephone Changing Business to "Buzzness?"

In a recent issue of the Chicago Evening American, B. C. Forbes relates the following story which illustrates the increasing difficulty of scampering off beyond the call of the telephone buzzer:

The president of the chamber of commerce of the borough of Queens, Long Island, N. Y., was delegated to induce Frank A. Vanderlip, head of America's largest national bank and also of America's largest international financial corporation, to make an address at a great gathering to be held on February 2.

On interviewing Mr. Vanderlip the chamber president learned that it would be impossible for the banker to attend the dinner as he was leaving New York on January 25 for New Orleans and thence he planned to journey to California for a six weeks' rest.

Mr. Vanderlip, having had a moderately busy time organizing the $75,000,000 Midvale Steel & Ordnance Co. and the $50,000,000 American International Corporation, acquiring control of the International Banking Corporation with its many foreign branches, building up the city bank's deposits from a quarter of a billion to over half a billion, and opening numbers of new branches in Latin-America, was really not sorry that his program compelled him to refuse the invitation.

He explained the position and the chamber's representative departed keenly disappointed. The matter was thus closed—apparently.

To. Mr. Vanderlip's surprise, his visitor returned. And this is the gist of what passed:

"You are going to be in Los Angeles on the second of February, aren't you, Mr. Vanderlip?"

"Yes."

"Well, we want that speech we set out to get you to give us. If you will deliver it in Los Angeles that will suit us all right."

Mr. Vanderlip did not quite understand and indicated so to the chamber of commerce president.

"We have arranged that if you will just talk into a telephone every guest at the dinner will hear you. Don't say you will throw us down now."

Before he had quite recovered from his astonishment Mr. Vanderlip had assented.

And so a great business men's dinner at one side of the American continent was addressed by a business man sitting in a room at the other side of the continent, a distance of 3,875 miles—farther than from New York to Europe.

Verily, the world do move!

With newspapers published daily at sea, with messages flashed to railway expresses traveling 60 miles an hour, with wireless reaching the uttermost ends of the earth and with telephones connecting every hamlet and resort in the land with every business center, where can harassed men of affairs go to be beyond reach of business and buzzness?

If journeying off nearly 4,000 miles does not win a financier release from making an address to his home town folks, where and how can a man hope to escape from the thoughts, the toils and the talking of business?

Annual Reports and Meeting of Telephone Companies

Statements Issued by Telephone Companies in Various Parts of the Country Relative to Their Operations During the Past Year—Earnings and Surplus Accounts Show Companies to Be in Excellent Financial Condition—Election of Officers

Keystone Telephone Co.'s Annual Report.

The Keystone Telephone Co., of Philadelphia, Pa., reports net profits of $361,013 for the year 1915, an increase of $3,497 over the previous year. President N. T. Folwell reports, in his annual statement, that in spite of the untoward events accompanying the European war, the company's lines have continued to extend in every direction throughout its territory. The number of telephone stations has increased and the number of messages handled has shown a larger gain than in any year of the company's history.

The properties included as a unit in the Keystone report consist of the Keystone Telephone Co. of Philadelphia, which holds a perpetual charter from the state of Pennsylvania and a perpetual franchise from the city of Philadelphia; also perpetual franchises in 41 boroughs and townships in the counties of Delaware, Bucks and Montgomery, in the state of Pennsylvania, and the Eastern Telephone & Telegraph Co., which holds unrestricted franchises in the cities of Camden, Gloucester and Cape May, in the state of New Jersey. It also controls the Camden & Atlantic Telephone Co. through ownership of a majority of its capital stock.

A notable event of the year, the report states, was the making of a contract with the Philadelphia Electric Co. for its use of the Keystone company's excess conduits. This contract has been submitted by the public service commission for approval, but no action as yet has been taken.

The Interstate Telephone & Telegraph Co. of New Jersey, with which the Keystone has interchanged traffic, as reported in a previous issue of TELEPHONY, has disposed of its plant. New traffic arrangements have now been made with the Delaware & Atlantic Telephone Co., under which not only may all the subscribers of the old Interstate company be reached by patrons of the Keystone company, but in addition all of the subscribers of the Delaware & Atlantic company in that territory. This means that over 30,000 telephones are added to the company's list of connecting stations.

Following is a comparative statement of earnings and expenditures for 1915 and 1914:

	1915.	1914.	Increase.	Increase, Per Cent.
Gross earnings	$1,361,754	$1,321,226	$40,528	3.00
Operating and maintenance charges	679,584	651,810	27,774	4.08
Balance available for interest and reserve, etc.	$ 682,170	$ 669,416	$12,754	1.87
Interest charges	321,157	311,900	9,257	2.88
Net profit for year	$ 361,013	$ 357,516	$ 3,497	.98

In addition to the continued payment of the usual 3 per cent. dividend on the preferred stock in both May and November, in July a first payment on the accumulated dividends was an-

nounced. At that time 2 per cent. was paid to the stockholders and provision was made for a second installment of 2 per cent. on February 1.

The combined balance sheet as of December 31, 1915, follows:

ASSETS.

Cost of property, including stock		$15,538,031
Materials and supplies on hand		51,992
Cash at banks and on hand		192,554
Accounts receivable		108,709
Reserve fund, cash		20,000
Prepaid accounts, etc.		240,906
Total assets		$16,152,192

LIABILITIES.

First mortgage 5 per cent. bonds, issued by the Keystone company		$ 6,325,000
First mortgage 5 per cent. bonds, issued by the Eastern company		250,000
Real estate mortgage		17,000
Interest on bonds		159,167
Current accounts, reserves and other current liabilities		152,413
Total liabilities		$ 6,903,580
Capital Stock Issued:		
Six per cent preferred by the Keystone company of New Jersey	$1,936,850	
Common by the Keystone company of New Jersey	5,000,000	
		$ 6,936,850
Surplus and Reserve:		
Renewal reserve	$1,414,876	
Surplus, December 31, 1915	896,886	
		2,311,762
		$16,152,192

PROFIT AND LOSS ACCOUNT.

Gross earnings	$1,361,754
Operating and maintenance charges	679,584
Balance available for interest and reserve, etc.	$ 682,170
Interest charges	321,157
Profit for year before reserve for depreciation, etc.	$ 361,013
Distribution:	
Discount on bonds	11,023
Added to renewal reserve	158,884
Added to surplus	74,895
Preferred stock dividend paid 1915, 6 per cent.	116,211
	$ 361,013

SURPLUS ACCOUNT.

Surplus, December 31, 1914	$ 899,465
Added December 31, 1915, as above	74,895
	$ 974,360
Less:	
Four per cent. dividend on preferred stock, cumulative account	77,474
Surplus December 31, 1915	$ 896,886

The officers of the company are as follows: Nathan T. Folwell, president; James Collins Jones, first vice-president; Edward M. Cooke, second vice-president; William W. Wharton, secretary and treasurer, all of Philadelphia.

The board of directors includes John I. Bishop, George Burnham, Jr., Percival E. Foerderer, N. T. Folwell, Clarence L. Harper, James Collins Jones, George Kessler, Louis J. Kolb and Michael Murphy, of Philadelphia; Heulings Lippincott, of Camden, N. J., and Marcus Beebe, of Boston, Mass.

Pacific T. & T. Co. Issues Annual Report.

The annual report of the Pacific Telephone & Telegraph Co., San Francisco, Cal., which includes the Sunset Telephone & Telegraph Co., the Bell Telephone Co. of Nevada and the Home Telephone & Telegraph Co., of Spokane, for the year ended December 31, 1915, shows gross operating revenues of $20,114,458. The operating expenses were $14,312,782, leaving net operating revenue of $580,676. Deductions for taxes and uncollectibles brings this amount down to $4,543,175. Adding $185,561 non-operating revenue, makes a total gross income of $4,728,736. Other deductions for rents, interest, etc., bring the net income down to $2,021,600. Of this amount $1,920,000 was paid in dividends and $101,600 credited to the surplus account.

The consolidated balance sheet as of December 31, 1915, follows:

ASSETS.

Intangible capital	$ 14,159,553
Plant	84,567,525
Other permanent and long-term investments	5,675,025
Cash and deposits	1,035,619
Bills and accounts receivable	1,753,146
Materials and supplies	696,932
Accrued income not due	34,076
Sinking fund assets	218,895
Prepayments	168,658
Unamortized debt discount and expense	2,136,695
Other deferred debits	15,861
	$110,461,985

LIABILITIES.

Capital stock—common	$ 18,000,000
Capital stock—preferred	32,000,000
Funded debt	42,673,000
Accounts payable and advances	4,276,608
Accrued liabilities not due	939,435
Insurance and casualty reserves	50,000
Liability for employes' benefit fund	500,000
Reserve for accrued depreciation	11,341,969
Corporate surplus unappropriated	680,973
	$110,461,985

The number of stations added during the year was 36,676, making the total stations at the close of the year 1915, 729,609. The net additions to plant during the year amounted to $1,637,512. On December 31, the total miles of wire in the company's system amounted to 1,901,877, an increase of 54,467 miles during the year. There were also added during the year 67 private branch exchanges, 710 miles of phantom circuits, 14 miles of subway and 50 miles of duct. The "Randolph" office of the company was completed during the year.

The amount, including interest, appropriated for the year 1915 for the pension, disability and insurance fund was $114,180. During the year benefits have been paid to 1,514 employes. The payments from the fund during the year were: Pensions, $8,578; accident disability benefits, $21,050; sickness disability benefits, $54,908; death benefits (including expenses), $12,546; disability expenses, $12,552; state insurance, $4,546. The balance remaining in the fund at the close of the year amounts to $500,000.

Earning of the Zenith Telephone Co., Duluth, Minn.

The gross earnings of the Zenith Telephone Co., of Duluth, Minn., in 1915 exceeded the 1914 earnings by $8,000, according to the annual report of the company, filed recently with the city auditor. The report shows that the company had a surplus of $965 last year, whereas in 1914 it had a deficit of $6,333.

The earnings last year were $160,545, and in 1914 totaled $152,341. Last year's expenses totaled $159,581, as compared with $158,674 in 1914. The expenses for the year include $31,866 paid in dividends, and $25,700 allowed for depreciation.

The earnings include $153,925, derived from subscribers' rentals, $599 from pay stations, $5,556 from toll lines and $465 from directory advertising.

The report shows that up to January 1, 1915, the company had invested $847,431 in the plant. In the year 1915 it expended a total of $39,573 in new equipment, bringing the total up to $887,004.

Shares of common stock in the company are valued at

THE LATEST IN AUTOMATICS

WHY should you use

THE RELAY AUTOMATIC TELEPHONE SYSTEM

BECAUSE

It Is Simple

The complicated apparatus and circuits are reduced to a minimum, the "searchers" and selectors, being common to a group of lines, are only in use during the actual setting up of the connections.

It Is Flexible

Circuit changes can be made readily to meet particular needs.

It Is Rapid

Owing to the rapidity with which relays work, many difficulties experienced with automatic systems are overcome. Hunting over large groups of trunks is practically instantaneous.

It Requires Little Attention

The relays are of similar type to those used in common battery manually operated systems, and experience with these has proved that after careful adjustment they require little further attention.

It Has No Wiping Contacts

The relays make direct contact to build up a required circuit, and there is no action corresponding to wipers rubbing over nine intermediate contacts to reach the tenth, as on electro-mechanical switches.

It Will Live Long In All Climates

The system being built up entirely of relays, there is little wear. Relays can be protected readily from dust and damp, as they can be covered conveniently in small units. They are therefore most suitable for extremes of climate conditions.

If you adopt it

THE RELAY AUTOMATIC TELEPHONE SYSTEM WILL SAVE YOU MONEY

The Relay Automatic Telephone Company, Ltd.

C/o Marconi Wireless Telegraph Company of America, Woolworth Building, New York.

Please tell the Advertiser you saw his Advertisement in TELEPHONY.

$185,900, and preferred stock at $478,725. The company has $129,000 worth of outstanding bonds and $47,747 in bills and accounts.

Financial Report of Hull Telephone System.

At the meeting of the Hull Telephone Co., Hull, England, the city accountant presented a summary of the accounts of the telephone system for the past year in connection with the original corporation system, and, in the case of the National Telephone System, which was taken over from the government January 1, 1912.

The gross income was $693,375 (£138,675. 2s. 9d.). The working expenses totaled $475,505 (£95,101. 18s. 6½d.); war bonuses, etc., $1,130 (£226. 4s. 4d.); marriage doweries and pensions, and one year's contribution to staff fund, $28,145 (£5,629. 2s. 1d.). Interest, sinking fund charges, etc., absorbed, $161,640 (£32,328. 6s. 8d.), making the total expenses $666,425 (£133,285. 11s. 7½d.) and leaving a net balance of $26,945 (£5,389. 11s. 1½d.). The loan repayment charges, $53,445 (£10,689. 6s. 1d.), are for one year for the original undertaking and as regards the old National undertaking from the date of borrowing (May 6, 1914). After paying the expenses of the removal of officers consequent upon the transfer, and meeting cost of replacement of switchboard cables, there remains $58,420 (£11,684. 7s. 7d.) in reserve fund.

A balance of $27,555 (£5,511. 12s. 10½d.) also stands to the credit of the appropriation account at the end of the year. The net capital expenditure, $990,915 (£198,183. 4s. 6d.), includes the purchase of the ex-National undertaking and $18,220 (£3,664) certified by the manager as capital xpenditure since January 1, 1912. The total capital outlay, irrespective of the agreed amount for depreciation, is $1,565,560 (£313,112. 5s.).

Semi-Annual Report of Columbus (Kan.) Mutual.

The Columbus (Kan.) Local of the Cherokee County Mutual Telephone Association reports a gross income of $4,076 for the six months ending December 31, 1915. The expenditures totaled $3,635, leaving a cash balance of $441. The company's assets, including $2,499 liquid assets and $825 fixed assets, total, $3,324, while its liabilities amount to $2,508.

The company operates a total of 501 telephones, including 142 single-line business telephones, 12 four-party line business telephones, 197 single line residence telephones, 147 four-party line residence telephones and three free telephones.

Tri-State Declares Fifty-First Quarterly Dividend.

On March 1 the Tri-State Telephone & Telegraph Co., of St. Paul, Minn., mailed to its stockholders checks in payment of the 51st quarterly dividend of 1½ per cent. In the letter accompanying the dividend President G. W. Robinson states that the company's progress during the year, as reflected in the annual report which is nearing completion, is very gratifying, the net income having been inceased 15 per cent. over the previous year. He states further that if the past two months may be taken as a criterion, it is believed that the year 1916 will prove equally satisfactory. During the month of January the number of new contracts for service was 73 per cent. greater than for the corresponding month of 1915.

Financial Report of Westby (Wis.) Telephone Co.

The financial report of the Westby (Wis.) Telephone Co. for the year ending December 31, 1915, shows a total operating revenue of $8,338. Deducting the total operating expenses ($6,044) leaves a net operating income of $2,294. Other deductions and additions from non-operating revenue, interest on notes and bills, and dividends leave a surplus for the year of $1,381. Adding this amount to the surplus December 31, 1914, makes a surplus, December 31, 1915, of $14,235.

Following is a condensed statement of revenues and expenditures for the year ending December 31, 1915:

Operating Revenues:		
Exchange telephone earnings	$8,091.62	
Exchange from connecting line	246.62	
Total operating revenues		$ 8,338
Operating Expenses:		
Central office	$1,075.48	
Wire plant	309.15	
Substation	575.87	
Commercial	340.00	
General	651.82	
Undistributed	193.30	
Depreciation, 7 per cent.	2,529.78	
Taxes	369.15	
Total operating expenses		6,044
Net operating income		$ 2,294
Add:		
Non-operating revenue, rent and profit from sales		606
Gross income		$ 2,900
Deduct:		
Interest on notes and bills		333
Net income		$ 2,567
Dividends paid in July, 1915		1,186
Surplus for year		$ 1,381
Add:		
Surplus December 31, 1914		12,854
Surplus December 31, 1915		$14,235

A comparative statement of the company's assets and liabilities as of December 31, 1915, and December 31, 1914, is given below:

	ASSETS. December 31, 1915.	December 31, 1914.
Capital Assets:		
Land	$ 2,400	.....
Building, fixtures and grounds	9,568	$10,403
Central office equipment	1,717	865
Wire plant construction and equipment	17,310	16,513
Substation equipment	8,288	7,854
General office equipment	160	158
Miscellaneous equipment	40	24
Utility equipment	107	322
Current Assets:		
Bank	1,036	.....
Cash on hand	25	25
Accounts receivable—exchange	1,283	1,550
Material and supplies	158	111
Prepaid insurance	.....	59
	$42,092	$37,884
	LIABILITIES.	
Capital Stock:		
Common stock issued	$15,450	$14,800
Depreciation reserve	7,993	5,768
Current Liabilities:		
Accounts payable	4,000	4,000
Miscellaneous, bank overdrawn	.....	194
Accrued Liabilities:		
Taxes accrued	389	243
Interest on notes and bills payable	25	25
Surplus	14,235	12,854
	$42,092	$37,884

On December 31, 1915, the company had in operation 602 telephones, an increase of 21 over the previous year.

The officers and directors of the company are as follows: R. T. Benson, president; C. W. Jaeger, vice-president; H. O. Stevlingson, secretary and treasurer; and George Byer, manager.

Driven —twisted —and firmly embedded

By One Man

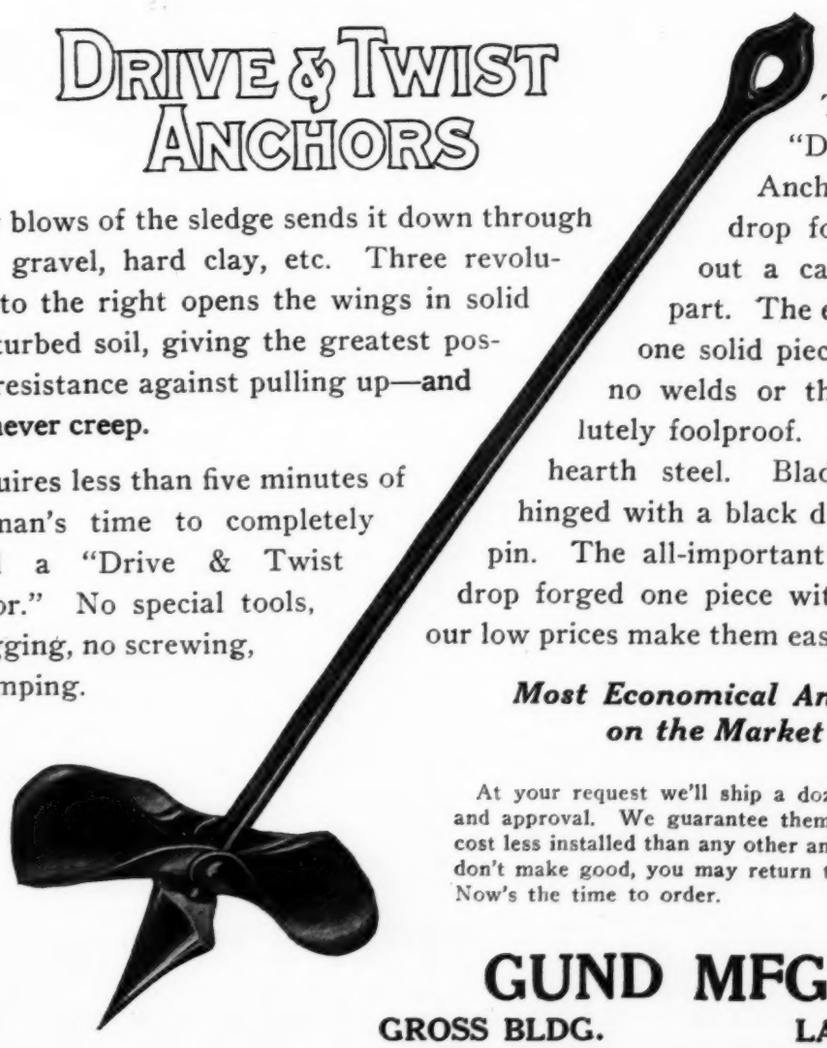
In a Few Minutes

No Method Could Be Easier or More Efficient

DRIVE & TWIST ANCHORS

A few blows of the sledge sends it down through roots, gravel, hard clay, etc. Three revolutions to the right opens the wings in solid undisturbed soil, giving the greatest possible resistance against pulling up—**and they never creep.**

It requires less than five minutes of one man's time to completely install a "Drive & Twist Anchor." No special tools, no digging, no screwing, no tamping.



NEW MODEL

The latest model "Drive & Twist Anchor" is made of drop forged steel without a casting or welded part. The eye is drop forged one solid piece with the rod—no welds or threads and absolutely foolproof. The rod is open-hearth steel. Blades are of steel hinged with a black diamond tool steel pin. The all-important driving point is drop forged one piece with the rod. And our low prices make them easily the

Most Economical Anchors on the Market

At your request we'll ship a dozen, subject to trial and approval. We guarantee them to hold more and cost less installed than any other anchor made. If they don't make good, you may return them for full credit. Now's the time to order.

GUND MFG. CO.

GROSS BLDG. LA CROSSE, WIS.

From Factory and Salesroom

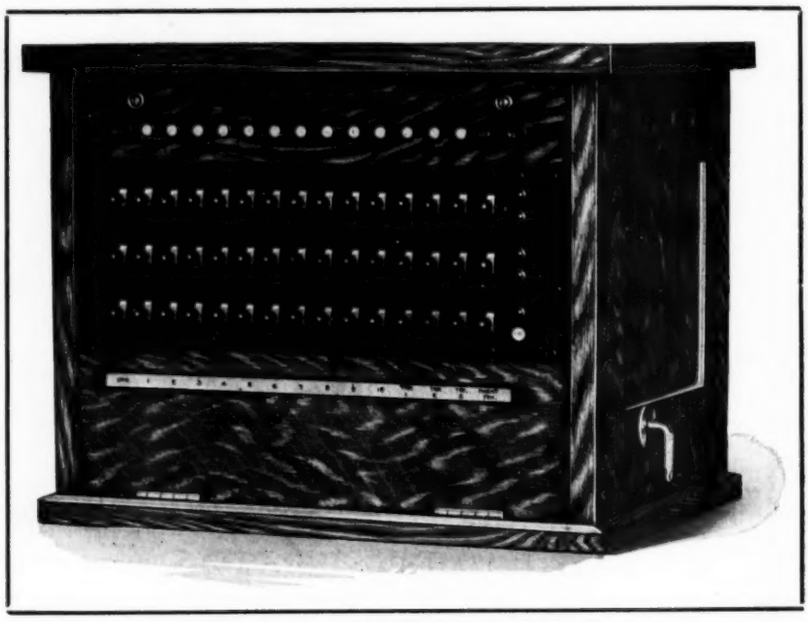
Conventions: Iowa, Des Moines, March 14-16; Texas, Fort Worth, March 16-18
Nebraska, Lincoln, March 28-29

Cordless Private Branch Exchanges.

In developing and supplying private branch exchange service, it has been found that in very small installations involving ten local lines or less, the usual switching by means of cords and plugs is undesirable. To solve the problem of furnishing service to these small plants in the most effective manner, the cordless private branch exchange equipment was developed. This type of board is so small and compact that it can be placed on a table, or other suitable support, without interfering to any extent with using the table or desk for clerical work. Thus the operator can attend to the board and do other work when not answering calls.

The accompanying illustrations show the face of the Kellogg standard type of cordless board. All switching operations are accomplished by means of keys.

The lines of the cabinet are pleasing and refined. The cabinet is furnished in the standard golden oak and birch mahogany finishes. If it is necessary, a finish can be supplied to exactly match the woodwork of the surroundings in which the board is to be placed. This will involve, however, a delay of several weeks and considerably increase the cost.

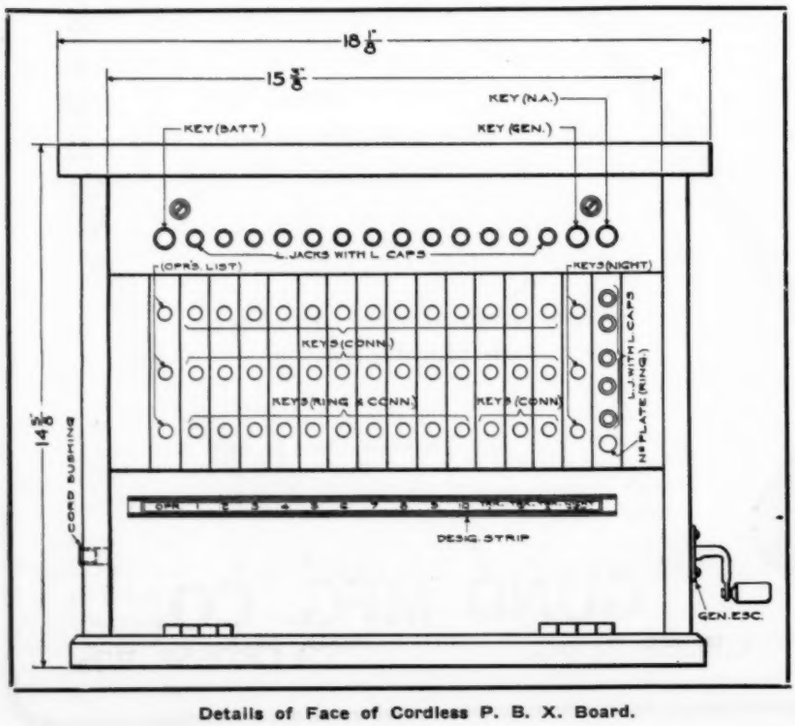


Front View of Cordless P. B. X. Board.

The first set of keys at the left of the board is so associated with the operator's telephone set that she can connect her instrument with any desired circuit of the board. These keys have the same functions as the operator's listening key associated with the cord circuit of the common type of manual switchboard.

The next ten sets of keys are line switching and ringing keys, whereby any line may be connected to any connecting circuit or rung by throwing the lower key to the ringing position. The three sets of keys on the right of the line switching keys, are the trunk keys. By means of these keys, any one of the three trunks may be connected to any one of the connecting circuits of the local telephone sets.

The last row of keys to the right are night keys for connecting, after the attendant has left, any trunk to any local telephone, making it convenient for answering calls which may come from the outside after the regular office hours.



Details of Face of Cordless P. B. X. Board.

A plainly marked designation strip, located below the key equipment, indicates the function of each set of keys. The designation insert marked "Ring" shows the position into which the lower row of line keys must be thrown to ring the local lines.

Above the key equipment are located the line and trunk lamps and the service keys marked "Battery," "Generator," and "Night Alarm." The line lamps are under the control of the local instruments and are illuminated in the usual manner by removing a receiver from a switch hook and remain lighted until the attendant gives attention to the call.

When an operator at the main exchange rings in over a trunk, the trunk lamp is lighted and can only be extinguished by the attendant at the branch exchange. This is due to the fact that the ringing current pulls up a line relay which locks itself until the attendant throws a key, associating the trunk with a connecting circuit.

The supervisory lamps are for signaling to an operator that the conversation is finished, when both parties hang up their receivers.

With the front of the board lowered, all of the key and apparatus wiring is accessible for inspection. The simplicity and neatness

"Buy Your Insurance at Cost" 25 to 40% saved

THE **Utilities Indemnity** Exchange offers a plan of reciprocal or inter-insurance for protection against fire losses and injury claims—a co-operative movement.

THE **purpose of the Utilities Indemnity** Exchange is to enable those engaged in operating and constructing telephone plants to protect themselves against injury claims and fire losses at actual cost, thus saving enormous overhead charges and operating expenses of the stock insurance companies.

DO **not wait** until your insurance expires or until you suffer a loss, but insure now.

THE UTILITIES INDEMNITY EXCHANGE is operated on a plan known as "Reciprocal Insurance," otherwise termed "Inter-Insurance." The losses are distributed among the members at actual cost, and all claim settlements are made on an equitable basis with due regard to the humane treatment of injured employees.

Are you going to join in 1916? Why not? Write for descriptive literature or request one of our representatives to call. Also, let us send you testimonial letters from satisfied members.

UTILITIES INDEMNITY EXCHANGE

LYNTON T. BLOCK, ATTORNEY AND MANAGER

RAILWAY EXCHANGE BLDG. ST. LOUIS, MO.

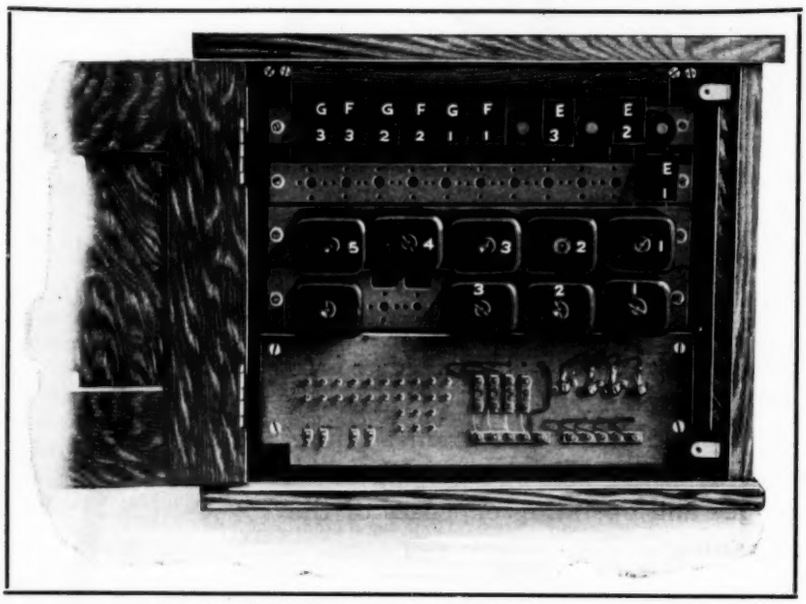
Please tell the Advertiser you saw his Advertisement in TELEPHONY.

of this requires no comment. The generator used is one of the Kellogg standard four-bar generators, powerful enough to ring all the telephones at once, if desired.

The rear equipment is shown in another illustration. At the lower part of the board, are located the fuse blocks and connecting rack on which the lines, trunks, attendant's instrument, battery leads and generator leads terminate. The batteries used may be either a set of 24-volt storage cells or a group or 18 dry cells. If a pole changer or other mechanical ringing device is used, its ringing leads terminate on the punching indicated.

On the relay strip immediately above the connecting rack, are located the trunk relays and night alarm buzzer, and immediately above, are the connecting circuit relays.

As the board described is of the 6-A or direct line lamp type, the mounting strip above the connecting circuit relays is vacant except for a condenser associated with one of the trunk circuits. If the board were of the 6-AA type, this strip would be occupied by ten line relays when fully equipped. The upper mounting strip is filled with the remaining trunk line condensers and a holding coil for each trunk.



Interior of Cordless P. B. X. Board From the Rear.

More Testimonials on Matthews' Woodpecker Telefault.

Additional letters commending the Matthews woodpecker telefault have been received by W. N. Matthews & Brother, of St. Louis, Mo., furnishing further evidence that the telefault is meeting with great favor in the field, and that it does everything its manufacturers claim.

The purchasers of the telefault from whom letters have been received, in addition to those mentioned in an item appearing in TELEPHONY of January 29, are: The New Ottawa County Telephone Co., Elmore, Ohio; Liberty Telephone Co., Liberty, Mo.; Hurmence Telephone Co., Sumner, Iowa; St. John Telephone Co., St. John, Kan.; West Texas Telephone Co., Brownwood, Texas; Stroudsburg & Bushkill Telephone Co., Stroudsburg, Pa.; Home Telephone Co., Champaign, Ill., and the Creston Mutual Telephone Co., Creston, Iowa.

Monarch Telephone Mfg. Co. Predicts Good Year.

In the opinion of the Monarch Telephone Mfg. Co., of Fort Dodge, Iowa, the year 1916 is going to see more telephone rebuilding and new construction work than any year for some little time. This opinion is based upon the business of the first two months and the indications for the balance of the year. The Monarch company's business for January showed a very substantial increase over any January for the several preceding years, and the February business was a record breaker of that period. The orders and inquiries are coming from all parts of the country, which indicates that a general buying movement has started. No one class of operating company is affected more than any other, as the activity seems to be very evenly divided among both the large and small companies.

The Stewart Test Set and Preparedness.

Last November one of the salesmen of Stewart Brothers, Ottawa, Ill., called upon a telephone company in Wisconsin and explained to the superintendent of plant the advantages of the Stewart test set. "It surely would be a good thing," the superintendent replied, "to locate lightning trouble, such as welded jumpers, bad carbons, welded inside wire, burned push buttons, burned generators' shunts, etc., as the lineman could drive direct to the trouble and waste no time driving over the line looking for the trouble." And he promised to buy one in the spring.

The salesman urged him to have it shipped at once, explaining that he needed it during the winter as much as in the spring. He told the superintendent how it would save time and livery, locating breaks, shorts, grounds and crosses left in the leads by wire gangs after sleet storms, etc., and all trouble caused by wind storms, etc. After further urging the salesman received a trial order and a set was accordingly shipped to him.

But a few days after the set had been received a sleet storm struck the portion of the state in which this telephone company operates. The superintendent was so glad he was prepared and had a Stewart test set on hand that he wrote a letter to Stewart Brothers, telling them so. "Believe me," he said, "I am a tickled fellow that you had it come before spring, which I wanted to do, for we had a very bad storm here last week, of sleet and a good heavy snow, which broke down a good many wires and poles. If I ever had anything come in handy it was that test set."

This letter, the Stewart Brothers state, is only one of hundreds of endorsements of their test set received by them.

Charles Splinter Engages in Model and Experimental Work.

Charles Splinter, for 13 years connected with the Kellogg Switchboard & Supply Co., as a foreman, has opened offices at 200 North Jefferson street, Chicago, where he will engage in model and experimental work. He will be prepared to manufacture special tools, as well as small machinery and electrical apparatus of all kinds.

Special attention will also be paid to the development of inventions, a feature which is rapidly becoming a prominent one in the industrial field. Many are inventors but their powers of invention are limited. One person has an idea and perhaps can carry it out to a certain point, but there it stops unless he can secure the services of someone capable of supplying the deficient ideas. Being an expert electrician as well as a practical machinist, Mr. Splinter is qualified to give assistance of this nature.

Paragraphs.

THE COFFEY SYSTEM & AUDIT CO., of Indianapolis, Ind., is installing its accounting system for the People's Telephone & Telegraph Co., Knoxville, Tenn., and the Musson Brothers Telephone Co., Atlantic, Iowa.

Come to Headquarters for Protective Apparatus

DURING our long and earnest endeavors in developing telephone protective equipment we have become acquainted with the workings of thousands of exchanges. Many contributed helpful, practical thoughts toward the perfection of COOK protective equipment.

The record of this B-4 Protector shows how the co-operation between Cook customers and Cook has worked for the good of the telephone industry.

Below is a reproduction of a page from our "Brown Book"—there are many more pages on Cook Protective Apparatus alone—have you read them?

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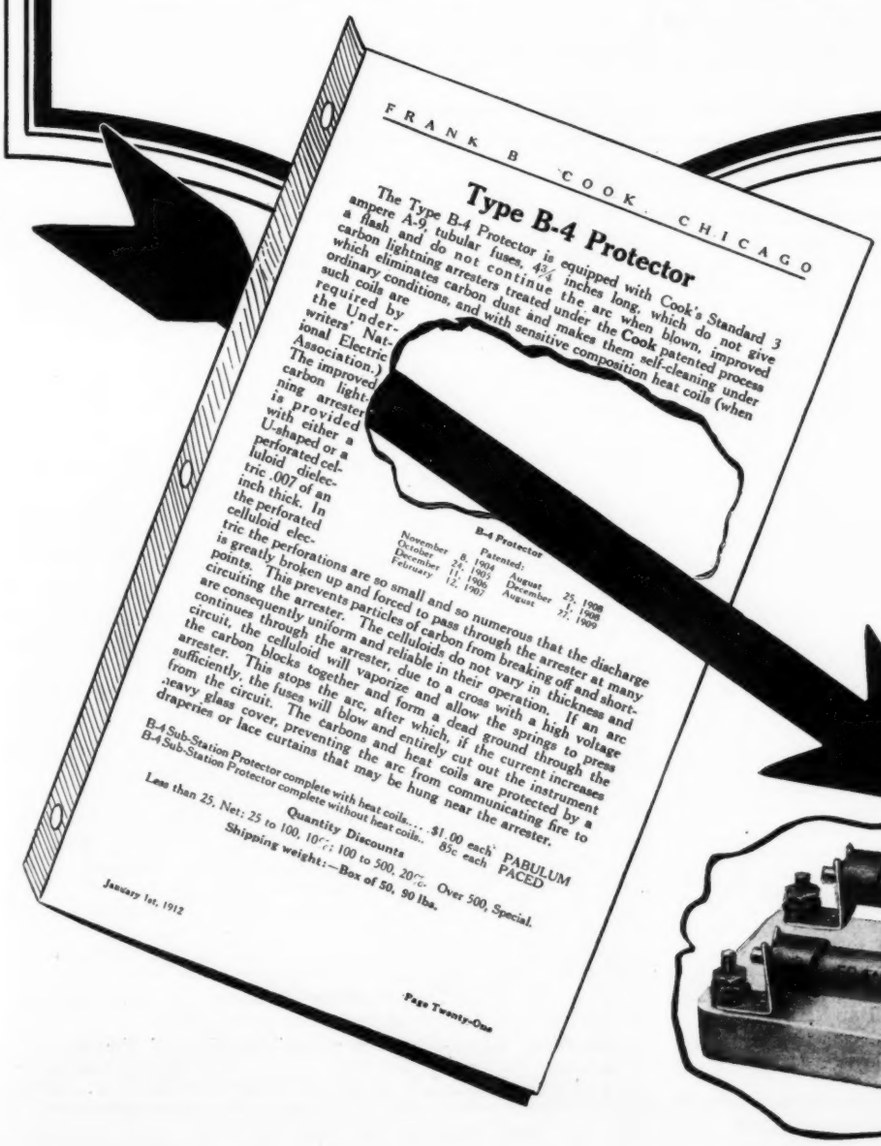


FRANK B. COOK CHICAGO

Type B-4 Protector

The Type B-4 Protector is equipped with Cook's Standard 3 ampere A-9 tubular fuses, 4¾ inches long, which do not give a flash and do not continue the arc when blown, improved carbon lightning arresters treated under the Cook patented process which eliminates carbon dust and makes them self-cleaning under ordinary conditions, and with sensitive composition heat coils (when such coils are required by the Underwriters' National Electric Association.) The improved carbon lightning arrester is provided with either a U-shaped or a perforated celluloid dielectric .007 of an inch thick. In the perforated celluloid electric the perforations are so small and so numerous that the discharge is greatly broken up and forced to pass through the arrester at many points. This prevents particles of carbon from breaking off and shortcircuiting the arrester. The celluloids do not vary in thickness and are consequently uniform and reliable in their operation. If an arc continues through the arrester, due to a cross with a high voltage circuit, the celluloid will vaporize and allow the springs to press the carbon blocks together and form a dead ground through the arrester. This stops the arc, after which, if the current increases sufficiently, the fuses will blow and entirely cut out the instrument from the circuit. The carbons and heat coils are protected by a heavy glass cover, preventing the arc from communicating fire to draperies or lace curtains that may be hung near the arrester.

B-4 Protector Patented:
November 8, 1904 August 25, 1908
October 25, 1904 December 7, 1909
December 15, 1905 August 7, 1909
February 12, 1907

B-4 Sub-Station Protector complete with heat coils.... $1.00 each PABULUM
B-4 Sub-Station Protector complete without heat coils.... 85c each PACED

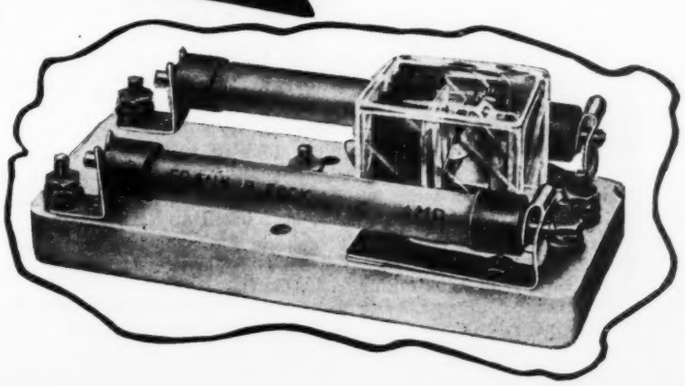
Quantity Discounts
Less than 25, Net; 25 to 100, 10%; 100 to 500, 20%. Over 500, Special.

Shipping weight:—Box of 50, 90 lbs.

January 1st, 1912

Page Twenty-One

Type B-4 Protector



Book Reviews.

THE GASOLINE AUTOMOBILE, by George W. Hobbs and Ben. G. Elliott. Published by the McGraw-Hill Book Co., New York. 259 pages, 6 ins. by 9 ins., 253 illustrations. Price $2 net.

This book was prepared in the extension division of the University of Wisconsin. Mr. Hobbs is an instructor in mechanical engineering in the extension division of the University of Wisconsin and Mr. Elliott is an associate professor of mechanical engineering of the University of Nebraska.

The work is intended to acquaint the average automobile owner with the principles and details of his machine and enable him to secure better service at less expense and, incidentally, prolong the life of his car. The telephone man who runs a car probably knows more about the electrical part of the machine than the common run of drivers, but the chapters in this volume contain much information that would be of great value to everybody.

A section of the book deals with general construction, another with the engine, and successive chapters are devoted to transmission, fuel and carburetting systems, lubrication and coaling, batteries and battery ignition, magnetos, starting and lighting systems, automobile troubles and remedies and operation and care.

A perusal of the pages will teach the automobilist the cause as well as the result of his manipulation of pedals and levers, and thus lead him to handle the mechanism more intelligently. The book was planned primarily for use in the university extension work in Wisconsin, for the instruction of those who drive, sell, repair or, in fact, have anything to do with motor cars, and was the outgrowth of a series of lectures on the subject delivered in a number of cities in the state. The book will well repay the study of those interested in automobiles.

OFFICIAL INDEX TO STATE LEGISLATION; Vol. 1 No. 4. Published by the Law Reporting Co., New York.

This index gives the number, date of introduction and member introducing, subject and effect or "short title" and position of every bill in every state legislature, arranged numerically and also a classification of all bills by subjects. A corrected and cumulated edition is published weekly to include all changes in positions of bills and new bills introduced during the week. These weekly supplements will be issued until the publication of the complete annual number about August 1, in which will be shown the status of the bills when the legislatures adjourned.

The subscription price to all the weekly numbers and the annual number and supplements, for 1916, is $100, and subscribers for 1916 will be furnished the final 1915 number for $10 additional, if desired.

The index is published in co-operation with the state legislature reference departments and libraries represented in the National Association of State Libraries and the American Association of Law Libraries, and under the direction of the joint committee on National Legislative Information of those associations.

Condensed News Reports

Officers of Companies Are Urgently Requested to Forward to Us Promptly All Financial and Other Statements as Soon as Issued and Any Items of Interest as to Their Plants and Systems

Personal.

PHILIP S. POGUE, general manager of the Louisville Home Telephone Co., Louisville, Ky., has been elected vice-president of the Louisille Jovian League.

A. D. COX, for the past year local manager of the Cumberland Telephone & Telegraph Co., at Elizabethtown, Ky., has been transferred to Louisville. He will be succeeded at Elizabethtown by J. M. Terry, of Munfordville.

MAJOR A. F. LEWIS has resigned his position as manager of the Carthage, Mo., exchange of the Missouri & Kansas Telephone Co., after 14 years of service in that capacity. He will be succeeded by Will Garrison, assistant manager of the Springfield exchange.

H. P. KING, district and local manager of the Southwestern Telegraph & Telephone Co., with headquarters in Terrell, Texas, has been transferred to Marshall, Texas, where he becomes district manager for several counties. He is succeeded as local manager at Terrell by F. W. Grant, formerly local manager at Marshall.

Obituary.

C. T. CURRIER, formerly traffic chief of the Columbus district of the Central Union Telephone Co., died recently at his home in Columbus, Ohio, from cerebral hemorrhage, at the age of 50 years.

JOHN M. ESHLEMAN, lieutenant governor of California and formerly president of the California Railroad Commission, died in the Southern Pacific clubhouse at Indio, Cal., following a hemorrhage. He had just arrived in Indio after a trip to Washington, which broke his frail strength.

New Companies and Corporations.

WATERVILLE, KAN.—The Waterville Telephone Co. was incorporated recently with a capital stock of $18,000.

WILBURTON, KAN.—The Wilburton Telephone Co. was incorporated recently with a capital stock of $220,000.

CANNEL CITY, KY.—The Cannel City Telephone Co. has been incorporated with $380 capital. The incorporators are E. M. Walter, M. F. Nickell, S. P. Nickell and Eli Phipps.

ALBA, MICH.—The Alba Telephone Co. was organized recently with a capital stock of $4,000. The incorporators are S. G. Eby, J. C. Single and A. G. Gorham.

AFTON, OKLA.—The United Telephone Co., whose headquarters are at Afton, with exchanges at Afton, Fairland, Grove, Bernice, Cleora and Ketchum, also operating numerous rural lines, has incorporated, the capital stock being $50,000.

COTTONWOOD, OKLA.—The Cottonwood Telephone Co. was incorporated recently with a capital stock of $200. The incorporators are J. W. Peoples, J. A. Brentle, H. Z. Wanzar, J. W. Griffin and J. Riggins.

GAGE, OKLA.—The Little Wolf Rural Telephone Co. was incorporated recently with a capital stock of $1,000. The incorporators are W. G. Darwin, H. A. Jantin and I. A. Ritz.

SUNNYSIDE, WASH.—The Valley Telephone Co. was incorporated recently with a capital stock of $50,000. The incorporators are L. E. Harrington, E. F. and C. M. Keyes.

LUSK, WYO.—Articles of incorporation for the Lance Creek Telephone Co. were filed recently. The firm has a capital stock of $1,500. Alfred Johnson, Albert Roshells and Andrew Anderson, all of Lusk, are the directors.

Financial.

BICKNELL, IND.—The Home Telephone Co., of Bicknell, has increased its capital from $12,000 to $25,000.

CAMDEN, IND.—The Camden Co-operative Telephone Co. declared the annual dividend of $10 a share and elected officers as follows: President, E. M. Cripe; vice-president, Milt Wilson; secretary, U. E. Tesh; treasurer, C. E. Rice; Trustee, George Hunt, and general manager, Monroe Martin.

GASTON, IND.—The Gaston Home Telephone Co. declared an 8 per cent dividend payable February 1, and elected C. W. Rector, John W. Lambert, Mark Power, C. F. Gronedyke, W. L. Milhollin, Allen Oxley, Joseph Hinton as directors. The officers are Mr. Rector, president; John W. Lambert, vice-president; Mark Powers, treasurer, and C. F. Gronedyke, secretary.

MORGANTOWN, IND.—The capital stock of the Morgantown Telephone Co. has been increased $10,000.

WARSAW, IND.—The Commercial Telephone Co., Warsaw, Ind., redeemed $50,000 of its preferred stock.

HOUSTON, MINN.—At the annual meeting of the People's Telephone Exchange, held recently, D. W. Robinson was elected president; Capt. S. B. McIntire, vice-president; C. F. Schon-

ERICSSON STEEL TELEPHONES

Five Reasons Why You Should Use Them

1st— They are the handsomest telephones made, and subscribers are pleased with them and take pride in keeping them neat. They put a stop to chronic kickers.

2nd— They are built to last almost indefinitely. The black enamel finish will outlast any known wood polish and will match any color of woodwork or inside finish.

3rd— They cost no more than reliable telephones of other makes, and are worth considerably more to you. They do not deteriorate and they save you the heavy maintenance expense you have been accustomed to with others.

4th— They are made by a manufacturer with a reputation for making the best telephone apparatus known. Their guarantee makes you safe.

5th— You will be using Steel Telephones altogether some day, so why not begin now. The sooner you get acquainted with the Ericsson kind the better pleased you will be later.

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Atlanta, Ga., 83 Marietta St.
Birmingham, Ala.
Boston, Mass., 451 Atlantic Avenue.
Butte, Mont., 53 East Broadway.
Cedar Rapids, Iowa, 315 So. Second St.
Chicago, Ill., 14 N. Franklin St.
Cleveland, O., 124 St. Clair Ave., N. E.
Edmonton, Alta, Can., 504 Agency Bldg.
Havana, Cuba, P. O. Box 6.
Indianapolis, Ind., 124 So. Meridian St.
Jacksonville, Fla., 24 W. Forsythe St.
Lincoln, Neb., 136 So. 10th St.
Los Angeles, Cal., 1233 So. Olive St.
Louisville, Ky., 514 W. Main St.
Minneapolis, Minn., 19 N. 6th St.
New Orleans, La., 810 Canal St.
Pittsburgh, Pa., 31 Terminal Bldg.
Portland, Ore., 329 Ankeny Ave.
Richmond, Va., 5 Governor St.
San Francisco, Cal., 530 Golden Gate Ave.
Spokane, Wash., Paulsen Bldg.
Toronto, Canada, 36 Adelaide St.

ERICSSON MFG. COMPANY

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au, secretary, and B. P. Benson, treasurer. It was decided to increase the stock to the amount of $3,000 at $10 per share.

AMHERST, OHIO.—The Amherst Home Telephone Co. has increased its stock from $25,000 to $50,000.

Franchise.

FORT WORTH, TEX.—The commissioners court of Tarrant county has granted a franchise to T. B. George to construct a telephone line along the Azle road from Fort Worth to the ten-mile bridge, northwest of the city.

Elections.

PARLIER, CAL.—At the annual meeting of the stockholders of the East Side Rural Telephone Co. which was held recently, the following board of directors were re-elected: F. H. Stoker, W. J. Lohman, J. P. Hughes, H. B. Quick, James Hamilton, B. Tobiasen and J. F. Parlier.

GRAND JUNCTION, COLO.—Telephone connection between Grand Junction and Salt Lake City will be established before the end of the coming summer, according to the plans announced at the annual meeting and election of officers of the Midland Telephone Co. J. N. Corbin was re-elected president of the Midland company and John E. Brown, was named vice-president. Frank C. Merriell, of Fruita, was named secretary and treasurer. The directorate elected was as follows: H. R. Risley, J. N. Corbin, J. E. Brown, William Campbell and Frank C. Merriell.

BLUFFTON, IND.—The annual stockholders' meeting of the United Telephone Co. was held and the following directors were re-elected: J. W. Sale and L. C. Davenport, A. G. Lupton, Hugh Dougherty, W. B. Cooley, J. W. Stickney, C. M. Nesbit, W. R. Hirst and J. L. Wayne.

CORYDON, IND.—The Harrison County Farmers' Telephone Co. at the annual meeting elected officers for the ensuing year as follows: President, John J. Gleitz; vice-president, Louis Temple; secretary, C. B. Anderson; treasurer, Sam P. Fisher and Charles Temple, director.

FAIRMONT, IND.—The Citizens Telephone Co. at the annual meeting elected directors as follows: George Felton, O. Buller, J. Roberts, R. A. Morris, Earl Morris, W. Leach and J. H. Simons.

GREENSBURG, IND.—W. B. Pleak, F. D. Armstrong and Charles Zoller were re-elected directors of the Independent Telephone Co. at the annual stockholders' meeting.

HEBRON, IND.—The Hebron Telephone Co. has elected officers for the ensuing year as follows: President, C. A. Warner; secretary, J. F. Bruner; and treasurer, Mrs. Mehilah Bruner.

LAGRANGE, IND.—The Northern Indiana & Southern Michigan Telephone, Telegraph & Cable Co. elected officers and directors for the year as follows: R. L. McGee, Ft. Wayne, president; Ira Ford, vice-president; A. H. Ellison, secretary and treasurer; L. M. Rowe, general manager; Dr. A. J. Hostetler, A. I. McClaskey and T. E. Ellison, directors.

WALLACE, IND.—Butler Myers, Michael Rudicil, Earl Myers and C. R. Thomas were re-elected directors and J. C. Goodin named to take the place of Aetna Fletcher in the Wallace Co-Operative Telephone Co.

BOONE, IOWA.—The annual meeting of the board of directors of the Boone County Telephone Co. was held recently. The old officers and directors were re-elected to serve another year. They are: President, E. O. Montgomery; vice-president, W. B. T. Belt; secretary, Guy H. Pratt; treasurer, O. C. Herman; local manager, O. P. Shurtz; assistant secretary and general manager, H. G. Conger. The rest of the directors follow: J. H. Andrews, Parley Sheldon, Dr. E. H. Melott, J. L. Stevens and S. S. McGrath.

BURDICK, KAN.—The Burdick Telephone Co. held its annual meeting recently and elected the following officers: S. F. Nelson, president; C. A. Carlson, vice-president; W. C. Smith, treasurer; H. V. Peterson, secretary. The following board of directors was re-elected: F. O. Peterson, O. Ohlman, H. B. Oberholser, O. V. Anderson, C. E. Carlson. The three auditors elected were: E. Perrson, W. A. Stevens, O. W. Sundeen.

ENSIGN, KAN.—The stockholders of the Ensign Telephone Co. held a meeting recently. J. D. Williams was elected president, G. H. Culver, C. A. Houser and H. C. Adams directors. The capital stock was increased from $3,000 to $30,000.

INMAN, KAN.—The Inman Mutual Telephone Co. held its annual meeting recently. The following officers were elected for the enusing year: Dr. O. W. Sprouse, D. C. Enns, P. M. Doerksen, H. Vogt and G. H. Balzer.

LITTLE RIVER, KAN.—The Mutual Telephone Co. held its annual meeting and the following outgoing officers were re-elected by acclamation, unanimously. President, J. L. Folck; vice-president, C. E. Ward; secretary-treasurer, Geo. Morehouse. Directors, W. H. Burke and Jefferson Dunham.

MCCUNE, KAN.—The McCune Telephone Co. held its annual meeting recently and elected W. M. Sayers, president; H. W. Smith, vice-president; W. T. Highland, secretary, and Fredrick Colham, treasurer. The purchasing agent is T. R. Landes.

ROBINSON, KAN.—The Robinson Mutual Telephone Co. held its annual meeting recently. President S. M. Ulsh, Secretary Jere Kimmel and Treasurer T. J. Sands were re-elected. The resignation of Frank Bechtold was accepted and L. E. Fiechter was nominated and elected to take his place as director. Frank Honer and T. J. Sands were re-elected directors.

AITKIN, MINN.—At the annual meeting of the Aitkin-Deerwood Telephone Co. the following officers were elected: President, C. P. De Laittre; vice-president, Mrs. Katie V. Hodgeden; secretary, F. E. Krech; treasurer and manager, Heman Moork. The directors of the company are C. P. De Laittre, Heman Moork, Mrs. Katie V. Hodgeden, J. B. Galarneault and F. E. Krech.

MANCHESTER, MINN.—The Manchester Farmers' Telephone Co. held its annual meeting recently. Officers elected were: O. C. Johnson, president; M. H. Donovan, vice-president; Alfred Lebeck, secretary; J. A. Halvorsen, treasurer; G. Ellegard, Albert Opshal, Thomas Lee, Dr. F. H. K. Schaaf, directors.

CASSVILLE, MO.—The members of the Farmers' Co-operative Telephone Co., held their annual meeting and elected the following officers for the year 1916: T. B. Yarnall, president; W. A. Cox, vice-president; Asa Beck, secretary. Directors, J. B. Hopkins, S. T. Sims, W. A. Cox, Geo. M. Bayless and E. N. Meador.

FAIRVIEW, MO.—At the annual meeting of the Fairview Telephone Co. W. C. Hedden was re-elected president, Geo. Shafer, Jr., vice-president, and Enoch Hedden, secretary and treasurer. Hardin Summers was elected trustee.

KING CITY, MO.—The annual meeting of the stockholders of the King City Telephone Exchange Co. was held recently. The board of directors elected for 1916 is comprised of J. Levy, Geo. Ward, J. A. Snapp, J. Millan, W. L. Cole and M. L. Copeland. The board of directors met later and elected Jacob Levy, president; J. A. Snapp, vice-president; James Millan, secretary; and George Ward, treasurer.

WARRENSBURG, MO.—At the recent annual stockholders meeting of the Johnson County Home Telephone Co., action was taken which amounts to a re-organization of the telephone industry in eastern Johnson county. The Warrensburg Home Co. and the Knob Noster Home Co., which were subsidiaries of the Johnson company, were absorbed, or merged into the parent company and the whole organization is now one, the Johnson County company, which will operate both exchanges. Directors were elected for the ensuing year as follows: W. J. Mayes, J. H. Lampkin, J. Wesley Stone, A. M. Craig, W. C. Kapp, Harry Clark, Nels Abrahams, Chas. T. Malcolmson and Chilton Atkinson. The officers elected for the ensuing year are: W. J. Mayes, president; W. C. Kapp, vice-president; J. H. Lampkin, secretary and treasurer. L. C. Henderson is manager of the Warrensburg exchange, and A. M. Craig is manager of the Knob Noster exchange.

CANDOR, N. Y.—At the annual meeting of the stockholders of the Candor Telephone Co. held recently, the following directors were elected: Thomas Pass, John P. Fiebig, Henry D. Heath, Charles F. Gridley, Eugene D. Holly, John T. Gridley, James K. Holly, F. L. Heath, Preston C. Meddaugh, Ashall H. Woodford. The directors elected the following officers: President, Thomas Pass; vice-president, Charles F. Gridley; secretary, treasurer and manager, Eugene D. Holly.

HOLCOMB, N. Y.—The Ontario Mutual Telephone Co. recently elected these officers: President, P. A. Spitz; vice-president, George P. Reed; secretary, Frank R. Appleton; treasurer, Chas. T. Zimmerman; manager, T. R. Appleton.

LAKE CRYSTAL, MINN.—The stockholders of the Blue Earth County Telephone Co. held their annual meeting and elected the following officers: President, E. A. Upson; secretary, D. E. Bowen; treasurer, A. N. Olson; directors for two years, John F. Jones of Cambria and John H. Jones of Lake Crystal.

MIDDLEBURG, N. Y.—At the annual meeting of the Middleburg Telephone Association these directors were chosen: Christopher S. Best, Daniel D. Frisbie, Albert E. Re Qua, Dow Beekman, Charles W. Vroman, George L. Danforth, Jacob L. Engle, Wellington E. Bassler, A. Bennett Engle, Mrs. Lydia A. Becker, Mrs. Ursula Best, James L. Baker, Mrs. Inez B. Young and Roger W. Cornell. The directors elected these

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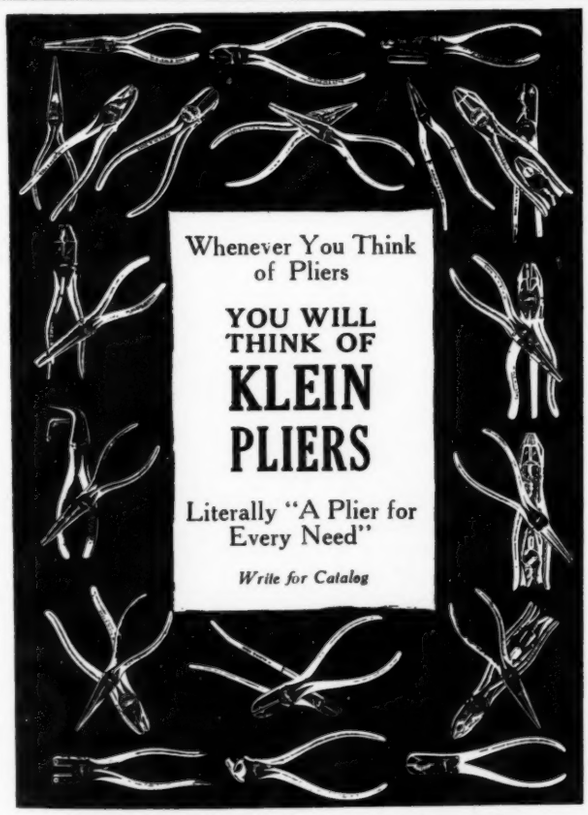

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One-half Size

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Cyclometers for Bicycles and Motorcycles, Odometers for Automobiles and Horse Drawn Vehicles, Counters for Practically Every Possible Purpose, Tachometers, Tachodometers, and Fine Die Castings.

officers: President, Christopher S. Best; vice-president, Daniel D. Frisbie; secretary, Dow Beekman; treasurer and manager, Charles W. Vroman; attorney, George L. Danforth. A 10 per cent. dividend was declared.

ROCHESTER, N. Y.—At the annual meeting of stockholders of the Rochester Telephone Co. Thomas E. Lannin, was elected a director to fill the vacancy on the board caused by the death of George C. Seager. The other members of the board elected had served previously and are: Innis P. Allen, H. F. Atwood, C. M. Beattie, F. M. Ellery, Gustave Erbe, George R. Fuller, Fred G. Goodwin, Morris D. Knapp, H. H. Littell, Carl F. Iomb, W. Roy McCanne, W. W. Miller, George D. Morgan, J. Craig Power, George F. Roth, Peter A. Vay, Albrecht Vogt, J. Foster Warner and Fred W. Zoller.

ASHLAND, OHIO.—At the annual meeting of the directors of the Star Telephone Co. the following directors were re-elected: Ira Everhard, of Wadsworth; Charles Graf, of Loudonville; Charles Rowland, of Lodi, and J. N. Brown, C. R. Freer, S. H. Grabill, C. W. Landis, F. N. Patterson and J. R. Swartz.

WATERLOO, OKLA.—The stockholders of the Waterloo Rural Telephone Co. met recently for their annual election. Geo. W. Brentlinger was elected president; A. W. Maker, secretary; John Zeigelgruber, treasurer, and T. W. Morgan, lineman.

STAYTON, ORE.—The Stayton Mutual Telephone Co., at its annual meeting, elected the following officers for the ensuing year: President, Henry Smith; vice-president, J. H. Ringo; secretary-treasurer, E. D. Alexander; directors, E. M. Olmsted, J. W. Mayo and John Thomas.

WILLAMINA, ORE.—At a meeting of the Bentley Telephone Co. the stockholders of the company reorganized, capitalized at $5,000 and elected the following officers: O. E. Lierman, president; R. A. Lierman, vice-president; E. B. Harris, treasurer and general manager; N. L. Atkins, secretary. It is the purpose of the company to build new lines and extend in to Newport and other parts of Lincoln and Tillamook counties.

MUNCY, PA.—The directors of the West Branch Telephone Co. met and elected the following officers: President, J. H. Bailey; vice-president, J. R. Glass; secretary and treasurer, Frank M. Opp; general superintendent, E. R. Swenk; executive committee, D. W. Shollenberger, chairman; Thomas K. Smith and William F. Madison.

WASHINGTON, PA.—The Chartiers Telephone Co., has elected Richard Hawkey president and general manager to succeed Edgar Charnock of Wheeling, and Thomas G. Davis secretary and treasurer to succeed M. K. Cochran, also of Wheeling. The new board of directors of the Chartiers company is composed of the following: Edgar Charnock, M. K. Cochran, T. G. Davis, Richard Hawkey and Frank C. Huling.

BRYAN, TEXAS.—The Kurten Telephone Co., at a meeting of the stockholders held recently, elected officers to serve during the ensuing year as follows: Rev. J. J. Kasiske, president; W. W. Manthei, first vice-president; M. B. Easters, second vice-president; Henry Prinzel, corresponding secretary; C. Hedke, financial secretary, and August Prinzel, treasurer.

CASCADE, WIS.—The Cascade Telephone Co. held its annual business meeting recently. The directors and officers were elected as follows: President, A. P. Sroghan; vice-president, W. J. Joslin; secretary, Paul E. Grabs; treasurer, H. W. Grohskoph, and director, Dr. J. E. Hoffman.

FOND DU LAC, WIS.—At the annual meeting of the Fond du Lac Rural Telephone Co. the following officers were elected: President, W. C. Ray; vice-president, J. M. Down; secretary and treasurer, W. T. Reilly; general manager, John Reilly; directors, O. F. Miritz, James Whalen, William Ebert and the officers. It is planned to rebuild several lines this year.

MERRILL, WIS.—The Chat Road Telephone Co. has been organized and the following officers elected: Charles Miller, president; Charles Mais, secretary, and Ole C. Larson, treasurer.

NELSON, WIS.—At a meeting of the directors of the Nelson Farmers Telephone Co., E. Geibel was elected president, L. Kennedy, vice-president, and Knut Johnson, secretary.

OAKFIELD, WIS.—At the annual meeting of the Oakfield Telephone Co., G. I. Edwards and W. C. Ehrhardt were re-elected directors for three years, and the following officers were elected: President, J. H. Bierne; vice-president, W. C. Ehrhardt; secretary, W. E. Bristol; treasurer, J. J. Burns; manager, T. E. Worthing. A six per cent. dividend was declared. The company purchased a lot on Main street upon which to erect a new exchange building.

OCONTO, WIS.—The Oconto Rural Telephone Co. held its annual meeting recently. The following directors were elected: Wesley Reed, O. P. Safford and T. McDowell.

PLYMOUTH, WIS.—The Plymouth Telephone Co. held its meeting and re-elected C. Pfeifer and B. W. Rowe as directors for the three enusing years. The other members of the board are C. C. Corbett, H. W. Hostman and J. Eastman. These are the officers of the company: President, C. Pfeifer; vice-president, B. W. Rowe; secretary, J. Eastman, and treasurer, J. W. Hostman.

SURING, WIS.—A meeting of the Suring Telephone Co. was held recently. The directors elected for the ensuing year are: J. C. Stengel, R. F. Zuehlke, Wm. Zingler, Paul Genke, Peter Ankerson, Fred Schuettpelz and August Voss. J. C. Stengel was elected president, R. F. Zuehlke, vice-president; Wm. Zingler, secretary and manager, and Aug. Voss, treasurer and lineman.

STOUGHTON, WIS.—The annual meeting of the Kegonsa Telephone Co. was held recently. The officers selected are: President, A. H. Holtan; vice-president, O. P. Swerig; secretary and treasurer, Alfred Nordlie; directors, O. P. Swerig, Alfred Nordlie, Alfred Eide, Nels Torgeson, Andrew Brickson, L. O. Fellan and O. T. Langemo.

Miscellaneous.

TUCSON, ARIZ.—Ground was broken recently for a new three-story building by the Mountain States Telephone & Telegraph Co., which will erect a new exchange at a cost of $70,000. The new building will contain a library, rest rooms, and shower bath for employes as well as a modern cooling plant. The site chosen is on East Pennington street. New equipment will be used throughout.

ELDON, IOWA.—A deed filed recently transfers the Eldon Telephone Co. from J. W. Calhoun, trustee, and H. J. H. Ives to J. W. Calhoun. The consideration is $7,000 and the property includes all the buildings and equipment in the office at Eldon as well as the wires, poles and other accessories in Wapello, Davis, Van Buren and Jefferson counties.

ARMA, KAN.—A new office and exchange building will be erected by the Arma Central Telephone Co. in the near future.

LITTLE RIVER, KAN.—The Mutual Telephone Co. has decided to install a completely modern new central equipment and switchboard. The following outgoing officers were re-elected: President, J. L. Folck; vice-president, C. E. Ward; secretary-treasurer, Geo. Morehouse. Directors: W. H. Burke and Jefferson Dunham.

OAKLEY, KAN.—The Oakley Telephone system has been sold to J. W. Matousek, formerly of Esbon, Kan.

WINCHESTER, KY.—The Cumberland Telephone & Telegraph Co. is beginning work on improvements that will cost $10,000. The wires between this city and Lexington are being restrung and two miles of cable are being placed to care for the local calls. Two new copper circuits are also being installed.

CRANE, MO.—G. W. Woodford, president; E. N. Christy, secretary and treasurer, and E. D. Christy, vice-president, have sold their stock in the Crane Telephone Co. to W. A. White, formerly of Cassville, Mrs. Minnie La Compt, of Cassville, and John A. Williams, of Crane. Mr. White is president of the new organization, Mrs. La Compt, secretary and treasurer, and Mr. Williams, vice-president. The former owners bought the exchange in 1911 and during their régimé the system has been improved and is now said to be one of the best in that section of the country.

DEEPWATER, MO.—The Missouri Union Telephone Co. has purchased a business lot in Deepwater and announces it will build a modern building exclusively for its use.

BOZEMAN, MONT.—Judge McClernan has recently signed a decree dissolving the State Telephone & Telegraph Co. More than two-thirds of the stockholders had petitioned for the dissolution and there being no objections offered and all claims against the company having been settled the order was signed.

NEWBERG, ORE.—Announcement has been made of plans for the erection of a new brick building to be the home of the Newberg Telephone Co. to cost approximately $5,000, and will be built by the company for its own use.

WEST CHESTER, PA.—The Eastern Perry Telephone Co. has sold its line to the Cumberland Valley Telephone Co. for $10,025.

MCMINNVILLE, TENN.—The McMinnville Telephone Co. has purchased the lines of the Postal Telegraph Co. running west from McMinnville on the Nashville road to Murfreesboro, and for five miles east. The Home company will reconstruct these lines at once and install an exchange in McMinnville.

ABBOTSFORD, WIS.—Some of the principal stockholders of the Clark County Telephone Co., of Colby, Wis., have purchased the Abbotsford exchange, and eventually, it is understood, it will become the property of the Clark County company.